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INSECTS INJURIOUS TO VEGETATION

1. Vine feeder. 2. Seventeen-year locust. 3. Butterfly. 4. Water scorpion. 5. Gadfly. 6. Apple-tree plant louse. 7. Grasshopper. 8. Tiger moth. 9. Dragon-fly. 10. Locust. 11. Lady bird. 12. Round-headed apple-tree borer. 13. Leaf beetle. 14. Larva of No. 12. 15. Star butterfly. 16. Goldsmith beetle. 17. Comma butterfly 18. Larva of No. 15. 19. Chrysalis of No. 15.

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—AND—

THE MANY THOUSANDS OF SUBJECTS
INTO WHICH THEY BRANCH

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—ASSISTED BY—

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KEY TO PRONUNCIATION

Three methods are used to indicate the pronunciation of the words forming the headings of the separate articles:

(1) By dividing the word into syllables, and indicating the syllable or syllables to be accented. This method alone is followed where the pronunciation is entirely obvious. Where accent marks are omitted, the omission indicates that all syllables are given substantially the same value.

(2) Where the pronunciation differs from the spelling, the word is re-spelled phonetically, in addition to the accentuation.

(3) Where the sound values of the vowels are not sufficiently indicated merely by an attempt at phonetic spelling, the following system of diacritical marks is additionally employed to approximate the proper sounds as closely as may be done:

ā, as in f*a*te, or in b*a*re.
ä, as in *a*lms, Fr. â*m*e, Ger. B*a*hn = â of Indian names.
å, the same sound short or medium, as in Fr. b*a*l, Ger. M*a*nn.
a, as in f*a*t.
ą, as in f*a*ll.
a, obscure, as in rur*a*l, similar to *u* in b*u*t, ė in h*e*r: common in Indian names.
ē, as in m*e* = *i* in mach*i*ne.
e, as in m*e*t.
ė, as in h*e*r.
ī, as in p*i*ne, or as *ei* in Ger. M*ei*n.
i, as in p*i*n, also used for the short sound corresponding to ē, as in French and Italian words.
eu, a long sound as in Fr. j*eû*ne, = Ger. long ö, as in Söhne. Göthe (Goethe).
eu, corresponding sound short or medium, as in Fr. p*eu* = Ger. ö short.
ō, as in n*o*te, m*oa*n.
o, as in n*o*t, s*o*ft—that is, short or medium.
ö, as in m*o*ve, t*wo*.
ū, as in t*u*be.
u, as in t*u*b: similar to ė and also to *a*.
ų, as in b*u*ll.
ü, as in Sc ab*u*ne = Fr. *û* as in d*û*, Ger. *ü* long as in gr*ü*n, B*ü*hne.
ů, the corresponding short or medium sound, as in Fr. b*u*t, Ger. M*ü*ller.
oi, as in *oi*l.
ou, as in p*ou*nd; or as *au* in Ger. H*au*s.

The consonants, b, d, f, h, j, k, l, m, n, ng, p, sh, t, v, and z, when printed in Roman type, are always given their common English values in the transliteration of foreign words. The letter c is indicated by s or k, as the case may be. For the remaining consonant sounds the following symbols are employed:

ch is always as in ri*ch*.
d, nearly as *th* in *th*is = Sp. *d* in Ma*d*ri*d*, etc.
g is always hard, as in *g*o.
h represents the guttural in Scotch lo*ch*, Ger. na*ch*, also other similar gutturals.
ŋ, Fr. nasal *n* as in bo*n*.
r represents both English *r*, and *r* in foreign words, in which it is generally much more strongly trilled.
s, always as in *s*o.
th, as *th* in *th*in.
th, as *th* in *th*is.
w always consonantal, as in *w*e.
x = ks, which are used instead.
y always consonantal, as in *y*ea (Fr. *ligne* would be re-written lēny).
zh, as *s* in plea*s*ure = Fr. *j*.

VOLUME V

Hall, EDWARD, an English chronicler, born in London about 1495. He was a lawyer by profession, and attained the rank of a sergeant, and the office of a judge in the sheriff's court. He had a seat in the House of Commons, and was a zealous Catholic. His death took place in 1547. *Hall's Chronicle* was published in 1548, and is a curious picture of the manners and customs of the age.

Hall, JAMES, author, was born at Philadelphia, in 1793; died in 1868. He studied law, practiced, and became a judge, and in 1830 established at Vandalia the *Illinois Monthly Magazine*. His works include *Legends of the West, Tales of the Border, The Wilderness and the War-path*, etc., and with T. L. McKinney, a handsomely illustrated work, *The History of the Indian Tribes of North America*.

Hall, JAMES, geologist, was born at Hingham, Massachusetts, in 1811; died in 1898. He was appointed on the New York geological staff in 1837, and began a survey of the west of the state. His researches won him distinction, their results being described in *The Palæontology of New York*. He was made state geologist of Iowa in 1855, of Wisconsin in 1858, and of New York in 1866.

Hall, JOSEPH, an English prelate and writer, born in 1574. He was educated at Emmanuel College, Cambridge, became successively dean of Worcester, bishop of Exeter (1627), and bishop of Norwich (1641). He agreed with the Puritans in doctrine, but disapproved of their views of church government, and took a prominent part in defending the liturgy of the church against the views published by the Nonconformists in the tract *Smectymnuus*. In 1642 he was sent to the Tower along with twelve other prelates who had protested against their expulsion from the House of Peers. In 1643, when the destruction of the Establishment was finally resolved on by the Puritans, he was specially named in the ordinance passed for sequestering what were called notorious delinquents, and heartlessly robbed of all his property by inquisitors, who turned him houseless into the streets. Ultimately he was allowed to take possession of a small estate which he possessed at Higham, in the vicinity of Norwich. Here he spent the remainder of his days unostentatiously, performing the duties of a faithful pastor, and died at the advanced age of eighty-two, in 1656. Amongst his writings are: *Virgidemiarum*, a series of poetical satires written in his earlier years; *A Century of Meditations; Contemplations;* etc.

Hall, MARSHALL, an English physician and physiologist, born in 1790; died in 1857. He studied at Edinburgh and on the European continent, commenced practice at Nottingham in 1815, and removed to London in 1826, where he obtained a large practice. Dr. Hall was distinguished by his medical writings on diagnosis, the circulation of the blood, and female diseases; but particularly by his discoveries made public in his work on the nervous system, and by his method of restoring asphyxiated persons.

Hall, NEWMAN, an English minister, was born in 1816; died in 1902. He preached in the Congregational Church of Hull, 1842-54, was an advocate of the cause of the North during the American Civil war, and came to America in 1867, where he preached before both houses of Congress. On his return to London he was instrumental in the erection there of a monument to Abraham Lincoln. His *Come to Jesus* had a large circulation, and he wrote

also, *Italy, the Land of the Forum and the Vatican*, and other works.

Hall, Robert, a celebrated divine among the Dissenters in England, was born at Arnsby, Leicestershire, in 1764, the son of a Baptist minister. He studied at the Baptist College at Bristol, and afterwards at Aberdeen. In 1783 he became assistant pastor of Broadmead Church in Bristol, suffered for a time from mental alienation, recovered and became pastor of the Baptist Church at Cambridge, where he soon acquired a great reputation by his preaching and his writings, such as *Apology for the Freedom of the Press* (1793); *Modern Infidelity* (1800); and *Reflections on War* (1802). He again became insane and resigned his charge, but recovering, married and settled at Leicester in 1808, till in 1826 he was again called to Bristol. Nearly all his life he suffered so intensely from calculus in the kidney that for twenty years he was never able to pass an entire night in bed, and could obtain rest only by a ruinous use of laudanum. He died in 1831.

Hall, Samuel Carter, an English writer, born in 1801; died in 1889. He studied law and became a barrister; reported parliamentary debates for the *New Times;* edited in succession the *Amulet*, the *New Monthly Magazine*, and the *Art Journal* (1839-80), besides various popular annuals, and the *Book of Gems*, *Book of British Ballads*, and *Baronial Halls*.

Hall, Thomas Cumming, theologian, was born in Armagh, Ireland, in 1858. He graduated at Princeton and studied at Berlin and Göttingen, and in 1898 became professor of theology in the Union Theological Seminary. Author of *The Power of an Endless Life*, *The Social Significance of the Evangelical Revival in England*, *The Synoptic Gospels*, *John Hall, Pastor and Preacher*, and contributions to the religious press of the country.

Hall of Fame of Great Americans. The institution thus named consists of a semicircular edifice on the ground of the University of New York, in New York City. It has a museum of seven rooms on the ground floor and a colonnade, 400 feet long, above. The building was erected in 1900 by aid of a gift of $100,000 from Helen Gould. There are 150 bronze tablets in panels to receive inscriptions of eminent citizens dead over ten years, 50 to be chosen in 1900 and 5 each succeeding five years; 50 votes from the selecting committee of 100 being needed to accept any name. At present only 51 names have been chosen, 29 in 1900, 11 in 1905, and 11 in 1910. The names chosen in 1900 were as follows: Washington, Lincoln, Webster, Franklin, Grant, Marshall, Jefferson, Emerson, Fulton, Longfellow, Irving, Edwards, Morse, Farragut, Clay, Peabody, Hawthorne, Peter Cooper, Whitney, R. E. Lee, Horace Mann, Audubon, Kent, Beecher, Story, John Adams, W. E. Channing, Gilbert Stuart, and Asa Gray. In 1905, J. Q. Adams, Madison, Lowell, Whittier, and Sherman; of foreign-born Americans, Hamilton, Agassiz, and Paul Jones, and of eminent women, Mary Lynn, Emily C. Johnson, and Maria Mitchell were elected. In 1910 the chosen names were Poe, Holmes, Bryant, Bancroft, Motley, H. B. Stowe, J. F. Cooper, Roger Williams, Phillips Brooks, Frances E. Willard, and Andrew Jackson.

Hallam (hal'am), Henry, an English historian, son of the dean of Bristol, born at Windsor in 1777. He was educated at Eton and Oxford, and studied for the law, but abandoned it for literary pursuits. His contributions to the *Edinburgh Review* brought him into notice, and his *View of the State of Europe during the Middle Ages*, which appeared in 1818, at once established his reputation. His next work, the *Constitutional History of England*, published in 1827, showed like the first the solid learning, patient research, accuracy and impartiality of statement, which are the characteristics of Mr. Hallam's work. In 1837-39 appeared his last great work, the *Introduction to the Literature of Europe*, a useful survey of literary history, though wanting in the fineness of judgment necessary for such a work. He died in 1859. His eldest son, Arthur Henry, a youth of high promise, suddenly cut off at the age of twenty-two, is the subject of Tennyson's poem, *In Memoriam*.

Halle (häl'lė), usually called Halle an der Saale (Halle on the Saale), to distinguish it from other places of the same name, an important German town in the Prussian province of Saxony, about 20 miles northwest of Leipzig, on the river Saale. The older streets are narrow and crooked, but the appearance of the town has of late been much improved. Among the principal buildings are the Church of the Virgin and that of St. Maurice, the 'Red Tower' (a clock-tower) in the market-place, the mediæval town-house, the ruined Moritzburg, originally the citadel, the university buildings, the Protestant cathedral, the theater, and

Francke's Institution, founded by Pastor Francke in 1698, comprising an orphan asylum, schools, etc. The university, with which that of Wittenberg was incorporated in 1817, is a celebrated institution founded in 1694, and attended by 1500 students. Halle has extensive trade and manufactures, chiefly chemicals, oil, malt, dyes, agricultural machines, etc., besides its celebrated salt-works. Halle is mentioned as early as 806. It was long a powerful member of the Hanseatic League. Pop. 169,916.

Halleck (hal'ek), FITZ GREENE, poet, born at Guilford, Connecticut, in 1790. He became a clerk in a New York banking-house, and for years was in the employment of John Jacob Astor. In 1819 poems by him and a friend (J. R. Drake) appeared in the *New York Evening Post* under the signature of *Croaker & Co.*, and attracted some attention. In 1820 he published *Fanny*, his longest poem, a satire on the follies and fashions of the day. In 1822 he visited Europe. Amongst his best poems are *Marco Bozzaris*, *To the Memory of Burns*, *Alnwick Castle*, and *Red Jacket*. He died in 1867.

Halleck, HENRY WAGER, an American general, born at Utica, near New York, in 1815; was educated for the army at West Point, and entered the engineers in 1839. In 1846 he published *Elements of Military Art and Science*, and he was raised to the rank of captain for his services in the Mexican war. In 1854 he left the army and settled in San Francisco as a lawyer and director of a mining company. On the outbreak of the Civil war in 1861 he was created major-general in the United States army. He commanded at the siege and capture of Corinth in 1862, and soon after was made commander-in-chief of the Union armies, directing their movements from Washington, till superseded by General Grant in 1864, when he was appointed chief of staff. Ultimately he received the command of the South Division at Louisville, where he died in 1872. Amongst his writings are two works on *International Law*.

Halleluia (hal-e-lö'ya), or HALLELUJAH, or ALLELUIA ('praise ye the Lord'), a Hebrew formula of praise often occurring in the Psalms, and which is retained in the translations of the various Christian churches, probably on account of its full and fine sound, so proper for public religious services. The *Great Halleluja* is the name given by the Jews to Psalms cxiii-cxvii, which are sung on the feasts of the Passover and Tabernacles.

Haller (hål'lėr), ALBRECHT VON, a Swiss physician and physiologist, born in Bern in 1708; studied medicine at Tübingen, and afterwards at Leyden under the famous Boerhaave. He became a public lecturer on anatomy at Bern, and afterwards physician to the hospital and principal librarian. In 1736 he was made professor of anatomy and surgery in the University of Göttingen. In 1747 his *Primæ Lineæ Physiologoiæ* appeared, and in 1757 his *Elementa Physiologiæ Corporis Humani*. Other works appeared later, and he was ennobled by the Emperor Francis I, and became chief magistrate of Bern, to which he had retired in 1753. Haller had a considerable reputation as a poet. He also wrote three philosophical romances, *Usong*, *Alfred the Great*, and *Fabius and Cato*. He died in 1777.

Halley (hal'li), EDMUND, an English mathematician and astronomer, born in 1656. He was educated at Queen's College, Oxford, published before he was nineteen a method for finding the aphelia and eccentricity of the planets, and stayed two years in St. Helena (1676-78) cataloging the stars of the Southern Hemisphere and arranging them into constellations. In 1682 he discovered the comet which bears his name, and his prediction of its return in 1759 was the first of its kind that proved correct. He surveyed the coast of Dalmatia at the request of the German Emperor, and returning to England, was elected Savilian professor of geometry at Oxford (1703). In 1713 he was made secretary of the Royal Society, and astronomer-royal in 1719. He died in 1742.

Halley's Comet, discovered in 1682 by Edmund Halley. (See preceding article.) Halley's demonstration that this comet was the same with the comet of 1456, 1531, and 1607 first fixed the identity of comets. It performs its revolution in about 75 years. Its last appearance was in 1910, when it failed to show the brilliance displayed on earlier occasions.

Halliwell-Phillipps, JAMES ORCHARD, originally J. O. HALLIWELL, Shakesperean scholar, was born in 1820; died in 1889. In 1839 he began his editorial labors with a reprint of *Mandeville's Travels*. He was a leading and active member of the Percy and Shakespere societies; for the former he edited the *Minor Poems* of Lydgate, *Early Naval Ballads of England*, *Nursery Rhymes of England*, etc.; and for the latter, *The Coventry Mysteries*, *Tarleton's Jests*, *The Fairy Mythology of Shakespere*, etc. His

chief Shakesperean publications are a *Life of Shakespere* (1848), the *Works of Shakespere* in 16 folio volumes, only 150 copies printed; *Calendar of the Records of Stratford-on-Avon; History of New Place;* and *Outlines of the Life of Shakespere.* He issued also 47 volumes of lithographed facsimiles of the quarto plays, and a great number of pamphlets on Shakespere, Stratford, and kindred topics. He also published a valuable *Dictionary of Archaic and Provincial Words.*

Hall-mark, the official stamp affixed by the Goldsmiths' Company of London and certain assay offices to articles of gold and silver as a mark of their fineness. The hall-mark generally denotes the place of manufacture or assay, as an anchor for Birmingham; a leopard's head for London; tree, salmon, and ring for Glasgow; a crown for Sheffield. The *standard-mark* for gold is a lion passant for England; for Edinburgh, a thistle; for Glasgow, a lion rampant; for Ireland, a harp crowned.

Hallow-even, or HALLOWE'EN (hal'ō-ēn), the evening of the 31st of October, so called as being the eve or vigil of All Hallows, or All Saints, which falls on the 1st of November. It is associated in the popular imagination with the prevalence of supernatural influences, and in Scotland is frequently celebrated by meetings of young people, with the performance of various mystical ceremonies humorously described by Burns in his poem *Hallowe'en.* The celebration of it in various ways has spread widely and is very common in the United States.

Hallucinations (hal-u-si-nā'shunz), according to Esquirol, are morbid conditions of mind in which the patient is conscious of a perception without any impression having been made on the external organs of sense. Hallucinations are to be distinguished from delusions, for in these there are real sensations, though they are erroneously interpreted. Pinel was the first who connected hallucinations with a disturbance of the phenomena of sensation, and the investigation has been pursued further by Esquirol, Maury, Brière, de Boismont, and others. All the senses are not equally subject to hallucinations: the most frequent are those of hearing; next, according to many, come those of sight, smell, touch, and taste; and hallucinations of several senses may exist simultaneously in the same individual, and also be complicated with certain delusions. The simplest form of hallucinations of hearing is the tingling of the ears; but the striking of clocks, the sounds of musical instruments and of the human voice are often heard, and in these instances, as in those of the perturbations of the other senses, there must be a diseased sensorium, though there should be no structural derangement of the nerves. Hallucinations are not confined to those whose mental faculties have been alienated, but occasionally assail and torment even the sane. Occasionally hallucinations supervene where the system is healthy, and the individual fully conscious of the unreality of the objects that address his senses, and this disorder is often associated with much ability and wisdom in the conduct of life. Amongst well-known and authenticated hallucinations are that of the second Earl Grey, who was haunted by a gory head, which, however, he could dismiss at will, and that of Bernadotte, king of Sweden, who was beset in his rides by a woman in a red cloak, although perfectly conscious of the hallucination under which he labored.

Halluin (äl-ü-aṇ), a town of France, dep. of Nord, on the right bank of the Lys, 10 miles N. N. E. of Lille. It has considerable manufactures of cloths, linen, and calicoes, besides cotton and oil mills, etc. Pop. 16,599.

Hallux (hal'lukz), the innermost of the five digits which normally compose the hind foot of a vertebrate animal; in a person the great toe, in a bird the hind toe.

Halmstadt (hälm'stät), a seaport of Sweden, on the Cattegat, at the mouth of the Nissa. It has cloth-making, brewing, salmon fisheries, and a trade in deals, lumber, pitch. Pop. 15,362.

Halo (hā'lō), the name given to colored circles of light sometimes seen round the sun or moon, and to other connected luminous appearances. These phenomena are classified as: (1) *halos proper,* consisting of complicated arrangements of arcs and circles of light surrounding the sun or moon, accompanied by others tangent to or intersecting them; (2) *coronas,* simple rings, generally somewhat colored; (3) *aureolas,* the name given to the kind of halo surrounding a shadow projected upon a cloud or fog-bank, or to the colored rings observed by aeronauts on the upper surface of clouds. All these appearances are the result of certain modifications which light undergoes by reflection, refraction, dispersion, diffraction, and interference when it falls upon the crystals of ice, the raindrops, or the minute particles that constitute clouds.

Halophytes (hal'o-fīts), a class of plants which inhabit salt marshes, and by combustion yield barilla, as *Salsola*, *Salicornia*, etc.

Halpine (hal'pēn), CHARLES GRAHAM, poet and humorist, born in Ireland in 1829, came to the United States when very young, and adopted the profession of journalism. He was a major in the Union army during the Civil war, and became brigadier-general of volunteers and brevet major-general in the regular army. He resigned in 1864. Under the pen-name of Private Miles O'Reilly he wrote *Poems*, *Miles O'Reilly Papers*, etc., gaining a reputation as a humorist. He died in 1869.

Halstead (hal'sted), MURAT, journalist, was born in Butler County, Ohio, in 1829. In 1867 he became proprietor of the *Cincinnati Commercial*, and in 1883 consolidated with it the *Gazette*. As editor he became an important figure in the annals of the Republican party. In 1889 he was nominated by President Harrison as minister to Germany. He wrote a number of works, historical and biographical, and died in 1908.

Ham, one of the three sons of Noah. He had four sons—Cush, Mizraim, Phut, and Canaan—from the first three of whom the tribes that peopled the African continent are stated to have sprung, while Canaan became the father of the tribes that principally occupied the territory of Phœnicia and Palestine. See *Hamites*.

Ham, the inner angle of the joint which unites the thigh and the leg of an animal, but more generally understood to mean the cured and smoked thigh of the ox, sheep, or hog, especially the last. Usually the meat is first well rubbed with salt, and a few days after it is rubbed again with a mixture of salt, saltpeter, and sugar, though sometimes the saltpeter is omitted. After lying for eight or ten days it is ready for drying. The smoking of hams consists in subjecting them to the smoke of a fire, wood being used in preference to coal in the process of smoking. A good ham should have the recently-cut fat hard and white, the lean fine-grained and of a lively red.

Hamadan (häm-å-dän'), a city of Persia, on the site of the ancient Ecbatana, in the province of Irak-Ajemi, 260 miles northwest of Ispahan. It is pleasantly situated near the base of a great range of mountains, has narrow and dirty streets, and is surrounded by heaps of ruins as well as by beautiful orchards and gardens. It has extensive caravanseries and bazaars, a number of tanneries, and also considerable manufactures of carpets, woolens, and cotton stuffs. Pop. estimated at 40,000.

Hamadryad (ham'a-drī-ad), in Greek mythology, a kind of wood-nymph conceived to inhabit each a particular tree, with which they were born and with which they perished.

Hamadryas. See *Baboon*.

Hamah (hä'ma), or HAMATH, a city of Syria, on the banks of the Orontes or El-Azy, on the caravan route between Aleppo and Damascus, in a well-watered and productive district. Amongst the curiosities are huge Persian water-wheels, 70 or 80 feet in diameter, which are turned by the current of the river and supply the houses and gardens with water. The famous *Hamath Inscriptions* were noticed by Burckhardt in 1812, but only recently examined and published. They are cut in relief on four stones of black basalt. The characters are entirely different from any others known, and no key to their decipherment has yet been discovered.

Hamamelidaceæ (ham-a-mel-i-dā'-se-ē), the witch-hazels, a small natural order of epigynous exogenous trees or shrubs, varying in height from 6 to 30 feet. *Hamamēlis Virginica* yields the drug witch hazel.

Hambato. See *Ambato*.

Hamburg (ham'burg), a maritime city in Germany, formerly free, now a portion of the empire, and the greatest commercial port on the continent of Europe, is situated about 80 miles from the North Sea, on the north branch of the Elbe, which is navigable for large vessels. The town of Altona adjoins it on the west. From the Elbe proceed canals which intersect the eastern and lower part of the city in all directions, and it is also intersected by the Alster, which here forms two fine streets, the Binnenalster and Aussenalster. The quays and harbor accommodations are very extensive. After the destructive fire of 1842 whole streets were rebuilt in a magnificent and expensive style. Hamburg is not, however, very rich in notable buildings. Amongst the most important are the church of St. Nicholas, a noble Gothic structure with a lofty tower and spire, built between 1845 and 1874; St. Peter's, another lofty Gothic edifice; St. Michael's, the largest of the churches; St. Catherine's, an ancient edifice; St. James's, erected in 1354, but surmounted by a modern tower;

an elegant Jewish temple; an exchange, a noble edifice, consisting chiefly of a magnificent hall, surrounded by a fine colonnade. There are also the Johanneum institution, containing an ancient college, museums, and the city library, with about 300,000 volumes; several well-endowed hospitals; zoological and botanic gardens; the Kunsthalle, a large collection of pictures and sculpture; theaters, etc. Hamburg is of most importance on account of its great shipping trade and the business of banking, exchange, marine assurance, etc., carried on in connection with that. Its manufactures, though large, are less important, including shipbuilding, tobacco and cigar making, iron-founding, brewing, etc. A great many emigrants embark here. Pop. 936,000. The state of Hamburg embraces a territory of 158 square miles, and consists of three divisions, viz.:—City of Hamburg, fifteen rural districts, and outlying towns and bailiwicks (Cuxhaven, Ritzebüttel, etc.). The legislative power belongs in common to the senate and the house of burgesses, but the executive power is vested chiefly in the senate, which is composed of eighteen members, of whom nine must have studied law or finance, and of the other nine seven must belong to the commercial class. The members are elected for life. The house of burgesses consists of 160 members, half of whom are elected every three years by the votes of all tax-paying citizens, while the other half are chosen partly by a much-restricted franchise, and partly deputed by guilds and corporations. The city owes its foundation to the emperor Charlemagne, who (808-811) built a citadel and a church on the heights between the Elbe and the eastern bank of the Alster, as a bulwark against the neighboring pagans. It became important as a commercial city in the twelfth century, and in the thirteenth it combined with Lübeck in forming the Hanseatic League. In 1618 Hamburg was formally acknowledged a free city of the empire. During the Thirty Years' war its population and prosperity continued to increase on account of the immunity of its position, and in the following century it obtained a large share of the trade with North America. In 1810 it was formally incorporated in the French empire along with the northwestern part of Germany. In 1815 it joined the Germanic Confederation as a free city. In 1888 the city was included in the Zollverein or German Customs Union.

Hamden, a town (township) of New Haven County, Connecticut, 6 miles N. of New Haven. Augers and garden implements are produced. Pop. 5850.

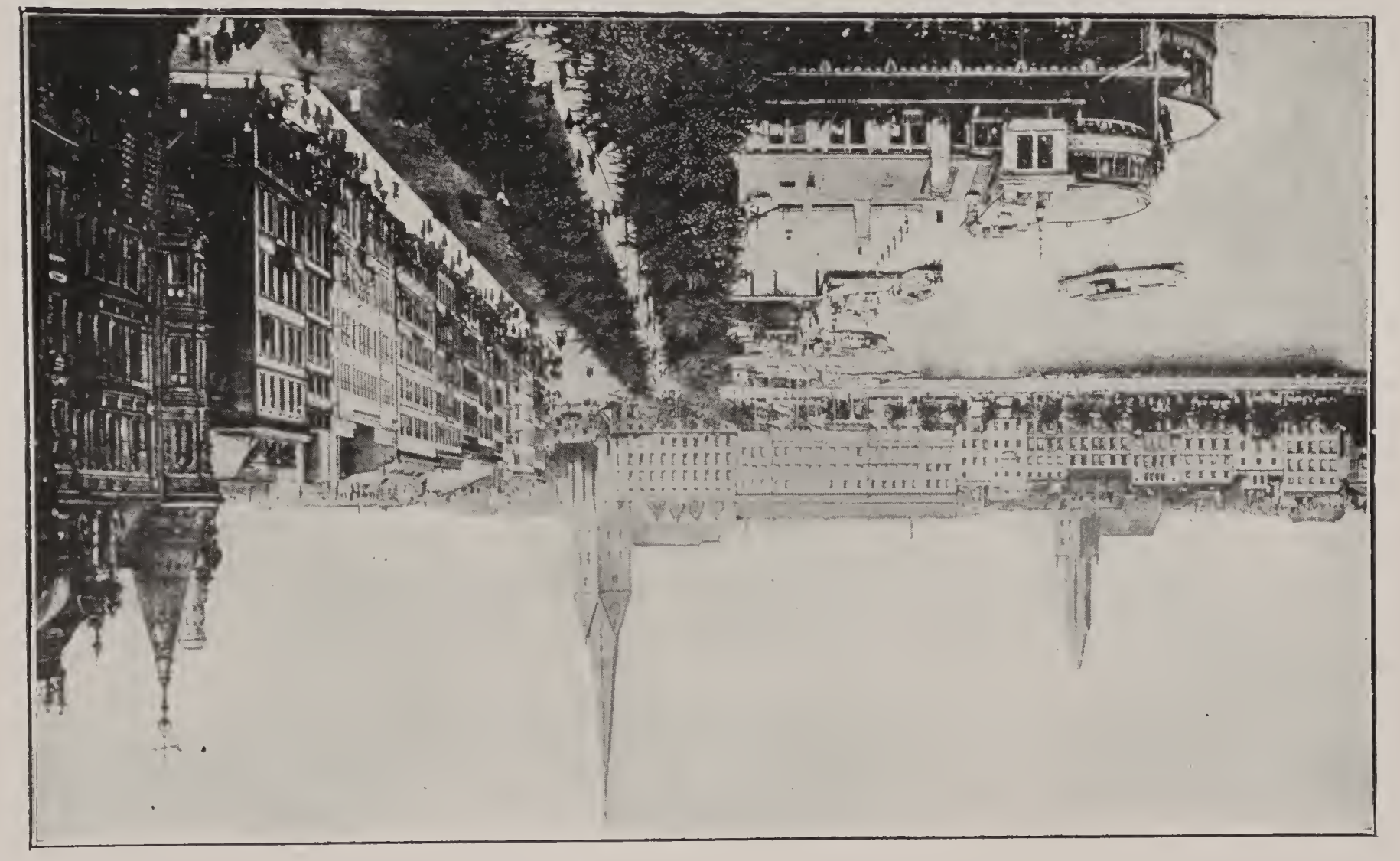
Hameln (hä'meln), a town of Germany, in Hanover, on the Weser, which is here crossed by a suspension bridge. It has many picturesque old buildings and remains. Pop. 18,965.

Hamerton (ha'mer-tun), PHILIP GILBERT, an English art critic, born at Laneside, in Lancashire, in 1834; studied landscape painting, but deviated into literature, publishing a work on *Heraldry* in 1851, and in 1855 *The Isles of Loch Awe and other Poems.* In 1859 Mr. Hamerton married a French lady, and afterwards resided chiefly at Autun. He made himself well known to the English public as a writer on art. Amongst his works are *Thoughts about Art* (1862), *Contemporary French Painters* (1867), *The Intellectual Life* (1873), *French and English* (1889), and several novels. He died in 1894.

Hamilcar (h a m-i l' kär), the name of several Carthaginian generals, of whom the most celebrated was Hamilcar, surnamed B a r c a (the lightning), the father of the great Hannibal. While quite a young man he was appointed to the command of the Carthaginian forces in Sicily, in the eighteenth year of the first Punic war, B.C. 247, when the Romans were masters of almost the whole island. For two years he defied all the efforts of the Romans to dislodge him; but the Carthaginian admiral, Hanno, having been totally defeated off the Ægates, B.C. 241, he reluctantly consented to evacuate Sicily. A revolt of the returned troops, joined by the native Africans, was successfully repressed by Hamilcar. He then entered on a series of campaigns in Spain, where he founded a new empire for Carthage. Here he passed nine years, and had brought the whole southern and eastern part of the country under Carthaginian rule when he was slain in battle against the Vettones, B.C. 229. His great design of making Spain a point of attack against Rome was ably carried out by his son Hannibal.

Hamilton (ham'il-tun), a city of Scotland, in Lanarkshire, on the Clyde, about 10 miles southeast of Glasgow. Numerous villas and gardens give it a pleasant rural aspect. Coal, ironstone, and limestone are extensively worked in the vicinity. The county buildings, town-hall, and extensive cavalry barracks are the most important public buildings. Near the town is Hamilton Palace, seat of the Duke of Hamilton, a large building, chiefly modern. In the

HAMBURG



adjacent grounds are the ruins of Cadzow Castle and a few old oaks, the remains of Cadzow Forest. Here a herd of wild cattle are kept, white, with black ears and muzzles. Pop. 32,775.

Hamilton, the island metropolis of the western district of Victoria, Australia, on the Grange Burn Creek, counties of Dundas and Normandy, 224 miles W. of Melbourne, with which it is connected by railway. The municipal area is 5100 acres, and there is a good supply of gas and water. There are a number of hotels, a hospital, town-hall, mechanics' institute, a district college, the usual government buildings, churches, and schools. The district is pastoral and agricultural. Pop. 4026.

Hamilton, the capital of the Bermudas, on the coast of the largest island, near the middle of the group. It has a landlocked harbor. Pop. 2246.

Hamilton, a town of Canada, in the province of Ontario, county of Wentworth, on the south side of Burlington Bay, Lake Ontario. It is situated in the center of a fine grain-producing region, and is an important center of the chief Canadian railways. The public buildings include custom-house, theatre, numerous churches and chapels, several substantial banks, and a handsome central school. It is the seat of an active and increasing trade, and has manufactures of paper, soap, iron goods, glass, carriages, etc. Pop. (1911) 81,879.

Hamilton, a town, capital of Butler County, Ohio, on the Miami River, 25 miles N. of Cincinnati. It is a prosperous manufacturing place, having large agricultural implement works, steam-pump and binding factories, paper and saw mills, etc. Pop. 35,279.

Hamilton, ALEXANDER, a distinguished American officer and legislator during the contest for independence, was born in 1757 in the island of Nevis, West Indies. At the age of sixteen he became a student of Columbia College, New York. On the outbreak of the war he received (1776) a commission as captain of artillery, and soon attracted the attention of Washington, who appointed him his aide-de-camp and employed him in the most delicate and difficult affairs. In 1781 he left the service, studied, entered Congress as a member from New York in 1782, and in 1787 was one of the delegates to the Constitutional Convention. He was a strong supporter of the federal party, and by the letters which he wrote to the *Daily Advertiser*, of New York, afterwards published under the title of *The Federalist*, contributed greatly to the success of the party. It was due to his strenuous efforts that the constitution was ratified by the state of New York. On the organization of the federal government in 1789, with Washington at its head, Hamilton was appointed secretary of the treasury, and won a high reputation by his skillful treatment of the national finances. This office he held till 1795, when he resigned and retired into private life. In 1798 he was appointed second in command of the provisional army raised under the apprehension of a French invasion, and on the death of Washington, in 1799, he became commander-in-chief. In 1804 he became involved in a political dispute with Aaron Burr, then candidate for the governorship of New York, accepted a challenge from that gentleman, and received a fatal wound in the subsequent duel, July 11, 1804.

Hamilton, ANTHONY, COUNT, a poet, courtier, and man of letters, was descended from a younger branch of the family of the dukes of Hamilton in Scotland, but was born in Ireland about 1646. After the death of Charles I he went with his parents to France, but after the accession of Charles II made frequent visits to England, and was appointed governor of Limerick by James II. Afterwards, on the ruin of the royal cause, he accompanied the king to France. His talents and agreeable manners made him a favorite in the best circles. He died at St. Germain in 1720. Count Hamilton is chiefly known by his *Memoirs of Count Grammont* (his brother-in-law), a lively and skillful picture of the frivolous life at the French and English courts of the time. The count's other works are *Poems and Fairy Tales* (burlesque), which, as well as the *Memoirs*, are in French, and are also remarkable for their fine wit and elegance of style.

Hamilton, GAVIN, a Scottish painter, born in Lanark about 1730. He studied at Rome, devoting himself to historic painting. In 1773 he published at Rome a folio volume, *The Italian School of Painting*, illustrated with splendid plates. His illustrations of Homer are amongst his best productions. He was very successful also as a discoverer of classical antiquities. He died at Rome in 1797.

Hamilton, JAMES, a marine painter, was born in Ireland about 1820, and was brought to the United States in infancy. He studied and practiced art in Philadelphia, and won distinction by his illustrations of Dr. Kane's *Arctic Explorations* and his ad-

mired *Capture of the Serapis* and *Old Ironsides*. He was especially successful in the representation of water scenes, and was unsurpassed in his delineation of oceanic effects. He died in 1878.

Hamilton, PATRICK, usually considered as the first Scottish reformer, was the second son of Sir Patrick Hamilton of Kincavel and Stanehouse, and of Catharine, daughter of the Duke of Albany, second son of James II. He was probably born in Glasgow in 1504, and was educated partly at St. Andrews and partly at Paris, where he took his degree in 1520. While still a boy he had been appointed Abbot of Fearn, in Rosshire, but never went into residence, settling instead at St. Andrews in 1523. Here he began to announce his convictions in the principles of the Reformation, and was summoned in 1526 by Archbishop Beaton to stand his trial for heresy. He fled to Germany, where his education as a reformer was completed by an intimate acquaintance with Luther and Melanchthon. After six months' absence he returned to Scotland, and began to preach the gospel openly at Linlithgow, but was allured by Beaton to St. Andrews under pretence of a friendly conference, put on his trial, convicted of various heresies, and burned at the stake, March 1, 1527, in the twenty-third year of his age. His death did perhaps more to extend the principles of the Reformation in Scotland than even his life could have done.

Hamilton, SIR WILLIAM, grandson of William, third duke of Hamilton, was born in Scotland in 1730. In 1761 he was elected member of parliament for Midhurst, and in 1764 he received the appointment of ambassador to the court of Naples. He devoted his leisure to science, making observations on Vesuvius, Ætna, and other volcanic mountains; and the results of his researches are detailed in the *Philosophical Transactions*, and in his *Campi Phlegræi, or Observations on the Volcanoes of the Two Sicilies* (Naples, 1776-79, three vols. folio). He took an active part in the excavation of Herculaneum and Pompeii, and collected a cabinet of antiquities, of which an account was published by D'Hancarville, in a splendid work with finely colored plates. Sir William's second wife was the Lady Hamilton, who became notorious from her connection with Admiral Nelson. He died in 1803.

Hamilton, SIR WILLIAM, a metaphysician, the most acute logician and most learned philosopher of the Scottish school, was born in 1788 at Glasgow, where his father and grandfather held in succession the chairs of anatomy and botany. Having studied with distinction at Glasgow, in 1809 he entered Baliol College, Oxford, as a Snell exhibitioner, where he gained first-class honors. In 1813 he was admitted to the Scottish bar, but never acquired a practice in his profession, his taste lying much more towards the study of philosophy, in which he had already made extensive researches. In 1820 he became a candidate for the chair of moral philosophy in Edinburgh, rendered vacant by the death of Thomas Brown, but being defeated by Professor John Wilson, he was obliged to content himself with the unimportant chair of universal history, forming no part of the college curriculum, to which he was appointed in 1821 by its patrons, the Faculty of Advocates. In 1829 the publication in the *Edinburgh Review* of his celebrated critique of Cousin's system of philosophy gave him at once a first place amongst the philosophical writers of the time. This was followed in 1830 by his criticism of Brown, and in 1831 by his article on the authorship of the *Epistolæ Obscurorum Virorum*. In 1836 he was appointed to the chair of logic and metaphysics in Edinburgh University. Here he gathered about him a number of ardent students, and re-established the fame of the Scottish school of metaphysicians, which had begun to wane. In 1846 he published an annotated edition of the works of Thomas Reid, and in 1854 the first volume of a similar edition of the works of Dugald Stewart. He died suddenly at Edinburgh in 1856. His lectures on logic and metaphysics were collected and edited by Dean Mansel and Professor Veitch. Hamilton's most important contributions to philosophy are connected with his doctrine of the Quantification of the Predicate in his system of logic; his theory of the 'relativity of knowledge,' in the Kantian sense, held along with an apparently incompatible doctrine of immediate perception of the non-ego; and his definition of the infinite or unconditioned as a mere negation of thought.

Hamilton, SIR WILLIAM ROWAN, mathematician and astronomer, was born in Dublin in 1805. Before he had completed his fourteenth year he had made himself acquainted with thirteen languages, among which were Arabic, Persian, Hindustani, Sanskrit, and Syriac. At the age of seventeen he was pronounced by a competent authority the first mathematician of his age. At Trinity College, Dublin, he gained the highest honors, and he was appointed in 1827 professor of astronomy in Trinity College,

HAMMERFEST, THE TOWN FARTHEST NORTH

as well as astronomer-royal. He was knighted in 1835, and elected in 1837 president of the Royal Irish Academy. He contributed numerous papers to the transactions of learned bodies, and made some valuable discoveries; but his fame is chiefly founded on his invention of the calculus of quaternions, a new method in the higher mathematics. Amongst his published works are *General Method in Dynamics*, *Algebra as the Science of Pure Time*, and *Memoirs on Discontinuous Functions*. He died in 1865.

Hamilton Group, an American geological formation, occupying the middle of the Devonian period, so named from Hamilton, New York, near which it is best displayed. It consists of shales, with some limestones, and follows the Appalachian system southward into Virginia, with an extension westward into and beyond Ohio. Flagstones of excellent quality are obtained from it, and some of its deeper bituminous) layers are supposed to be the chief source of the Pennsylvania and West Virginia petroleum and natural gas. The fossils include land and water plants, invertebrate animals and fishes.

Hamirpur (hum-ēr-pu̯r′), a town of India, Northwestern Provinces, on the right bank of the Jumna. Pop. 7155.

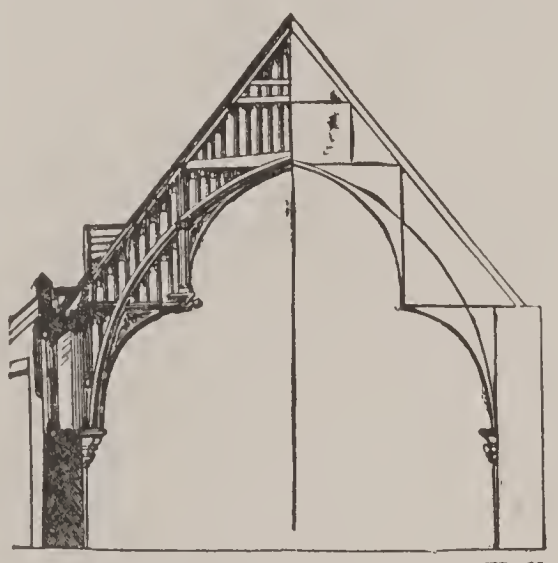
Hamites (ham′īts; descendants of Ham), the name given to a number of races in North Africa, who are regarded as of kindred origin and speak allied tongues. They include the ancient Egyptians and their modern descendants, the Copts, the Berbers, Tuaregs, Kabyles, the Gallas, Falashas, Somali, Dankali, etc.

Hamlet (ham′let), Prince of Denmark, the hero of Shakespere's most famous tragedy. The story is founded on an old tradition, related, amongst others, by Saxo-Grammaticus, of a Danish prince, Hamlet, who lived about 500 B.C., but is essentially altered in details and conclusion.

Hamlin (ham′lin), Hannibal, Vice-President, was born at Paris, Maine, in 1809. He learned printing, practiced law, and served as a member of the Legislature. In 1842 he was elected to Congress, and in 1848 United States Senator. In 1860 he was nominated by the Republican party for Vice-President and was elected, with Lincoln for President. He was returned to the Senate in 1869, serving until 1881, and died in 1891.

Hamm (häm), a manufacturing town of Prussia, province of Westphalia. Its industries, which are important, are mainly in metals. It still retains its old walls, which are, however, covered with houses and gardens. Pop. (1905) 38,430.

Hammer-beam, a short beam attached to the foot of a principal rafter in a roof, in the place of the tie-beam. Hammer-beams are used in pairs, and project from the wall, extending less than half-way across the apartments. The hammer-beam is generally supported by a rib rising up from a corbel below; and in its turn forms the support of another rib, constituting, with that springing from the opposite hammer-beam, an arch.



Hammer-beam Roof, Westminster Hall.

Hammer-cloth, a cloth sometimes used to cover the box-seat of a private carriage. It usually bears the coat of arms of the owner of the carriage.

Hammerfest (häm′ėr-fest), a maritime town in Norway, in Finmarken, on Hvalöe (Whale Island), a bare, treeless, barren spot, in lat. 70° 40′ N., being th s the most northerly town in the world. It is a fishing center, and carries on a lively trade. Though within the Arctic circle, the winter is comparatively mild, and the surrounding waters seldom freeze. Pop. 2298.

Hammer-headed Shark. See *Shark*.

Hammer-oyster, a bivalve shell-fish, *Malleus vulgāris*, inhabiting the Indian Archipelago, resembling the pearl-oyster when young, but becoming always more hammer-like as it advances in age, by the lengthening of its two ears.

Hammer-Purgstall (pu̯r g-stål′), Joseph Freiherr von, an eminent orientalist, was born in 1774 at Gratz, in Styria. He was educated at the Oriental Academy, Vienna, and when still a very young man

took a share in the preparation of Meninsky's *Arabic, Persian, and Turkish Lexicon.* In 1799 he accompanied as interpreter to Constantinople the internuncio Freiherr von Herbert, who afterwards intrusted him with a mission to Egypt, where he collected various antiquities and manuscripts for the Imperial Library. He also accompanied, as interpreter and secretary, Sir Sidney Smith and Yussuf-Pasha in the campaign against General Menou. In 1810, on the occasion of the marriage of Napoleon with Maria Louisa of Austria, he accompanied the latter to Paris, where he became intimate with Sylvestre de Sacy and other orientalists. In 1817 he was appointed imperial councillor at the court of Austria, where he also held the post of interpreter. On succeeding to the estates of the Countess of Purgstall in 1835 he received the title of *Freiherr* (Baron). He died in 1856. Among his numerous literary works may be mentioned *Constitution and Administration of the Ottoman Empire; Constantinople and the Bosporus; History of the Ottoman Empire* (ten vols.); *History of Turkish Poetry;* and *History of Arabic Literature.*

Hammersmith, a suburban district of London, in Middlesex, about 6 miles W. S. W. of the London post-office. The Thames is here crossed by a fine suspension bridge. The vicinity is occupied chiefly by nurseries and market-gardens. Pop. of parish, 121,603.

Hammerstein (h a m ′ ėr-stīn), Oscar, theatrical and operatic manager, born at Berlin, Germany, in 1847; came to America in 1863. He engaged in the cigar business, invented labor-saving devices in this industry, grew wealthy, and engaged in theatrical and operatic enterprises. He wrote several short comedies in German and produced them in New York. Became manager of the Stadt Theater in 1870, and subsequently built the Harlem Opera House, the Manhattan Opera House, and several theaters. He built in 1907 a magnificent opera house in Philadelphia, which he sold in 1910 and went to England, where he built a grand-opera house in London. He acted as manager of his own opera houses, obtained the best talent available, and produced operas on a splendid scale of efficiency.

Hammock (ham′ok), a rectangular piece of cloth or netting about 6 feet long and 4 feet wide, gathered together at the two ends and slung horizontally, forming a sort of bed or place in which one may recline for pleasure. Hammocks are in common use on board ships of war. The word is said to be of Caribbean origin.

Hammond (ham′und), a city of Lake County, Indiana, 20 miles S. S. E. of Chicago. It has a large slaughter house, a distillery, and manufactures of hardware, steel springs, nails, chemicals, etc. Pop. 20,925.

Hammond, John Hays, mining engineer, was born at San Francisco in 1855. He studied mining at Freiburg, Saxony, and became an expert on the United States geological survey in 1880. He subsequently examined mining fields in all parts of the world, being consulting engineer in South Africa 1893-96. Then he joined in the reform movement, but took no part in the Jameson raid; yet was arrested in connection with it and sentenced to death, a sentence afterwards commuted to fifteen years' imprisonment. He was later released on payment of a fine of $125,000. He was subsequently interested in many large mining operations, and was at one time prominently named for Vice-President of the United States, but declined to appear as a candidate. In 1911 he was appointed to represent the United States at the coronation of Georve V of Great Britain.

Hammond, William A., surgeon, born at Annapolis, Maryland, in 1828; died in 1900. He graduated at the University of New York in 1848, and entered the army as assistant surgeon. He became professor of anatomy and physiology in the University of Maryland in 1860, re-entered the army in 1861, and was appointed surgeon-general in 1862. He was court-martialed and dismissed from the army in 1864, having given offense to some superior officers, but was restored and placed on the retired list by Congress in 1879. He was professor of nervous diseases at Bellevue Hospital (1868-73) and subsequently at the University of New York. He wrote *Sleep and its Derangements*, and other medical works, and several novels.

Hammonton, a town in Atlantic County, New Jersey, 31 miles S. E. of Philadelphia. It is in a fruit and poultry region, and produces wines, cut-glass ware, etc. Pop. 5088.

Hampden (hamp′den), John, celebrated for his patriotic opposition to taxation by prerogative, was born in London in 1594, being cousin-german by the mother's side to Oliver Cromwell. In 1609 he was entered a gentleman commoner at Magdalen College, Oxford. He began the study of law in the Inner Temple, but having inherited an ample fortune on his father's death he lived the usual life of a country gentle-

man. He entered Parliament in the beginning of Charles I's reign as member for Grampound, and continued to sit in the House of Commons three times in succession as member for Wendover, and finally as member for Bucks. Although for some years a uniform opposer of the arbitrary practices in church and state, it was not until 1636 that his resistance to Charles's demand for ship-money made him the argument of all tongues. Although the decision in the Court of Exchequer was given against him by seven voices to five, the victory, as far as regarded public opinion, was his. In the following year (1637) he was one of those who meditated emigration to America, which they were prevented from carrying out by an order in council detaining them. Henceforward he took a prominent part in the great contest between the crown and the Parliament, and was one of the five members whom the king, in 1642, so imprudently attempted, in person, to seize in the House of Commons. When the appeal was made to the sword, Hampden accepted the command of a regiment in the Parliamentary army under the Earl of Essex, and was fatally wounded on Chalgrove Field, 24th June, 1643.

Hampshire (hamp'shir), HANTS, or SOUTHAMPTONSHIRE, a maritime county, including the Isle of Wight, in the south of England; area 1640 sq. miles. Its surface is pleasantly varied with gently rising hills, fruitful valleys, and extensive woodlands. The coast-line is very irregular; the principal indentation, Southampton Water, is navigable almost to its head for vessels of considerable burden. In its confines is the New Forest, and among its streams is the Avon. Two ranges of chalk hills, the North and South Downs, traverse the county, running in direction nearly east and west. On the Downs large flocks of sheep, known as the 'Hampshire Downs' are fed. Hampshire is also famous for its wool, bacon, honey, and timber. The manufactures are unimportant, but the shipping is very extensive. Pop. 915,503.

Hampstead (hamp'sted), a suburb of London, and Parliamentary borough in Middlesex. It is situated on the declivity of a hill on the northwestern side of the city, and has long been celebrated for its fine air and the beauty of its surroundings. Hampstead Heath crowns the summit of the hill, and is now sprinkled over with handsome villas. Pop. 82,329.

Hampton (hamp'tun), a village of Middlesex, situated 14 miles s. w. of London, on the left bank of the Thames. Pop. 9221. About a mile from the village are the palace and park of Hampton Court, originally built by Cardinal Wolsey in 1525. Hampton Court has been the residence of many sovereigns, from Henry VIII, to whom it was presented by Wolsey, down to George II. It contains a valuable collection of pictures by Holbein, Lely, Kneller, West, etc.

Hampton, a town, capital of Elizabeth City County, Virginia, on the north side of Hampton Roads, 15 miles N. N. W. of Norfolk. It contains the Hampton Normal and Agricultural Institute, organized in 1868 and devoted to the instruction of colored and Indian students. It has also a National Soldiers Home and a National Cemetery. There are various manufactures, and fish and oysters are shipped. It is a popular resort, and is near Fortress Monroe and Old Point Comfort. Pop. 5505.

Hampton, WADE, grandson of a Revolutionary general of the same name, was born at Columbia, South Carolina, in 1818; died in 1902. Graduating at the University of South Carolina, he became a lawyer, and on the outbreak of the Civil war joined the Confederate army. In 1862 he served as a brigadier-general at Antietam and in 1863 was wounded at Gettysburg. Promoted major-general, he was placed in command of all the cavalry of Lee's army in 1864, and served in South Carolina in 1865. He was elected governor of South Carolina in 1876 and again in 1878, was United States Senator, 1879-91, and was appointed commissioner of railroads in 1893.

Hampton Court Conference, a conference which took place in 1604 at Hampton Court under the presidency of James I between the representatives of the Episcopalian and Puritan parties in the church. A few slight alterations were made in the Common Prayer Book, and it was determined that a new version of the Bible should be undertaken. This, the Authorized Version, appeared in 1611.

Hampton Normal and Agricultural Institute, a college for colored and Indian youths of both sexes, founded in 1868, under the auspices of the American Missionary Association and under the charge of General Samuel C. Armstrong, at Hampton, Virginia. At first devoted to colored students, Indians were admitted in 1878, 15 held as prisoners of war being the first students. The Indian pupils are chiefly from the Sioux tribe. Instruction is given in farm work and in various trades to boys, and in household work, sewing, etc., to girls. The institute has a

tract of 185 acres of farm land, and a few miles away has 600 acres mainly devoted to stockraising. The students are kept under military discipline. They number about 1300 colored and 60 Indians, under 100 instructors. Among the numerous graduates the most notable has been Booker T. Washington, of Tuskegee Institute.

Hamster (ham'stėr; *Cricetus*), a genus of rodent animals belonging to the family of the Muridæ (mice). They are distinguished by their having cheek-pouches in which they convey grain, peas, etc., to their winter residence, and are common in the north of Europe and Asia.

Han, a Chinese dynasty (B.C. 206 to A.D. 220), with which commences the modern history of China.

Hanaper (han'a-pėr), formerly an office in the English Court of Chancery, so called because all writs regarding the public were once kept in a *hanaper* or hamper.

Hanau (han'ou), a town of Prussia, province Hesse-Nassau, at the confluence of the Kinzig with the Main. Pop. (1905) 31,637.

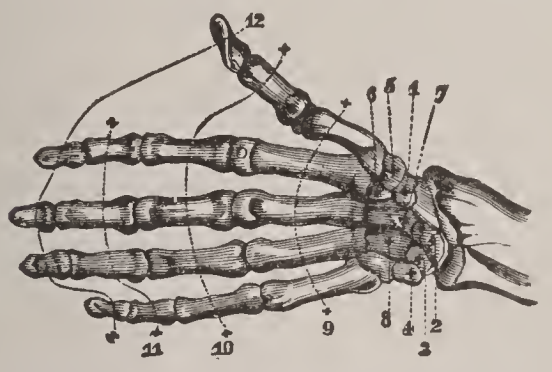
Hancock (han'kok), JOHN, a Revolutionary patriot and president of Congress, born in Quincy, Massachusetts, in 1737. In the inception of the Revolutionary struggle he was a leading spirit, and the attempt to arrest Hancock and Samuel Adams led to the battle of Lexington. Mr. Hancock was a member of the Continental Congress from 1775 to 1780, also from 1785 to 1786, serving as president of the body from 1775 to 1777. The Declaration of Independence as first published bore only his name. He served as governor of Massachusetts twelve years. As an orator he was eloquent; as a presiding officer, dignified and impartial. He died in 1793.

Hancock, WINFIELD SCOTT, soldier was born in Montogomery County, Pennsylvania, in 1824; graduated at West Point in 1844, served as lieutenant in the Mexican war, and was made captain in 1855. In 1861 he was appointed brigadier-general of volunteers, and served with distinction in the early years of the war, on the Peninsula, at Antietam, and at Fredericksburg. He commanded a corps at Gettysburg and was wounded. In 1864 he took command of the second corps of Grant's army, and at the battle of Spotsylvania captured nearly 4000 prisoners and twenty pieces of artillery. In 1864 he was made brigadier-general in the regular army and major-general in 1866, and held several commands until 1880, when he was nominated by the Democratic party as its candidate for the Presidency. He was defeated by Garfield, the Republican candidate, and died in 1886.

Hancock, a town of Houghton County, Michigan, connected with Lake Superior by a ship canal, and on the Copper Range and the Mineral Range railroads. Rich veins of pure copper are mined here, and there are extensive stamping mills, large foundries and machine shops, smelting works, etc. Pop. 8981.

Hand, the part of the body which terminates the arm, consisting of the palm and fingers, connected with the arm at the wrist; the principal organ of touch and prehension. The human hand is composed of twenty-seven bones, namely, eight bones of the carpus or wrist arranged in two rows of four each, the row next the forearm containing the scaphoid, the semilunar, the cuneiform, and the pisiform, and that next the metacarpus, the trapezium, the trapezoid, the os magnum, and the unciform. The metacarpus consists of the five bones which form the palm, the first being that of the thumb, the others that of the fingers in succession. Lastly, the fingers proper contain fourteen bones called phalanges, of which the thumb has but two, all the other digits having three each. These bones are jointed so as to admit of a variety of movements, the more peculiar being those by which the hand is flexed backwards, forwards, and sideways, and by which the thumb and fingers are moved in different ways. The chief muscles which determine these movements are the *flexors*, which pass down the forearm, are attached by tendons to the phalanges of the fingers, and serve to flex or bend the fingers; and the *extensors* for extending the fingers. There are two muscles which flex all the fingers except the thumb. The thumb has a separate long and short flexor. There is a common extensor for the fingers which passes down the back of the forearm and divides at the wrist into four tendons, one for each finger, each being attached to all three phalanges. The forefinger and little finger have, in addition, each an extensor of its own, and the thumb has both a short and a long extensor. The tendons of the muscles of the hand are interlaced and bound together by bands and aponeurotic fibers, and from this results a more or less complete unity of action. It is sometimes difficult to make a movement with a single finger without the others taking part in it, as in executing instrumental music, for instance; but practice gives to these movements perfect independence. Of all the movements of the

hand the opposition of the thumb to the other fingers, alone or united, especially characterizes the human hand. This action of the thumb results from its length, from the first metacarpal bone not being placed on the same plane as the other four, as is the case in the monkey, and from the action of a muscle—the long flexor of the thumb—peculiar to the human hand. This muscle completes the action of the other motor of the thumb, and permits man to hold a pen, a graver, or a needle; it gives to his hand the dexterity necessary in the execution of the most delicate work. Properly speaking then, the hand, with its highly specialized muscles, belongs to man alone. It cannot be considered, as in the ape, as a normal organ of locomotion, though it is closely approached in structure in the highest apes. It is essentially the organ of touch and prehension. It molds itself to a body to ascertain its form; it comes to the aid of the eye in completing or rectifying its impressions. The functions of touch devolve principally upon its anterior or palmar face, the nervous papillæ abounding specially at the end of the fingers. A layer of adipose tissue, very close in texture, protects, without lessening its power or its delicacy, the network of muscles, vessels, and nerves, with which this remarkable organ is equipped.



Skeleton of Human Hand and Wrist.

1. Scaphoid bone. 2, Semilunar bone. 3, Cuneiform bone. 4, Pisiform bone. 5, Os trapezium. 6, Os trapezoides. 7, Os magnum. 8, Unciform bone. 9, Metacarpal bones of thumb and fingers. 10, First row of phalanges of thumb and fingers. 11, Second row of phalanges of fingers. 12, Third row of phalanges of thumb and fingers.

Handball, a game of ball, played without any instrument for striking, the bare hand only being used. The game is a favorite with boys in the United States, and here are to be found the most expert players. Two or four men can play, one or two on a side.

Handcuffs, an instrument formed of two iron rings connected by a short chain or fixed on a hinge on the ends of a very short iron bar, which, being locked over the wrists of a malefactor, prevents his using his hands.

Händel (han'del; properly Haendel), George Frederick, a great German composer, born at Halle on the Saale, in 1685. The strong passion which he early showed for the art overcame his father's opposition to training him as a musician, and at the age of seven he was placed under the tuition of Zachau, organist of Halle Cathedral, and was soon so far advanced in the practical part of the science as to be able to officiate occasionally as deputy to his instructor. In 1696 he was sent to Berlin, where he heard the music of Bononcini and Ariosti, then at the head of the Berlin Opera House. He returned to Halle, was appointed organist of the cathedral in 1702, but soon left to visit Hanover and Hamburg, where Steffani and Reinhard Keiser, the latter the greatest German operatic composer of his day, resided. At Hamburg he played second violin in the orchestra, and brought out in 1704 his first work, an oratorio on the *Passion*, and his first opera, *Almira*, followed in February by his *Nero*, and subsequently by his *Florinda and Daphne*. In 1706 he went to Italy, visiting Florence, Venice, Naples, and Rome. On his return to Germany he entered the service of the Elector of Hanover, afterwards George I of England, as musical director. He visited England twice, and ultimately, having received a pension from Queen Anne, settled down there. For some years his popularity was very great. He was placed at the head of the newly-founded Royal Academy of Music, and accumulated a large fortune

George Frederick Händel.

in spite of the heavy losses which he incurred by setting up an opera company in opposition to that supported by the leading nobility and the principal Italian singers. Amongst the operas which he had composed up to this date (1735) are: *Radamisto*, *Ottone*, *Giulio Cesare*, *Flavio*, *Tamerlano*, *Scipio*, *Ricardo I*, *Orlando*, *Ariadne*, etc. His last opera was performed in 1740. By this time he had begun to devote himself chiefly to music of a serious nature, especially the oratorio. The approval which his first works of this kind (*Esther*, 1731; *Deborah*, 1732; *Athalia*, 1733) had met with encouraged him to new efforts; and he produced in succession *Israel in Egypt*, *L'Allegro* and *Il Penseroso*, *Saul*, and *The Messiah*. The last-mentioned, which is his chief work, was brought out in 1741, for the benefit of the Foundling Hospital. It was not much appreciated at the first representation, but increased in reputation every year. In 1742 the *Samson* appeared, in 1746 the *Judas Maccabæus*, in 1748 the *Solomon*, and in 1752 the *Jephthah*. In 1752 he became blind, but did not lose his spirits, continuing to perform in public and even to compose. He died at London in 1759, and was buried in Westminster Abbey. Händel was of large and ungainly person. His manners were rough and his temper violent, but his disposition was humane and liberal. As a musician his characteristics are boldness and strength of style and combination of vigor, spirit, and invention in his instrumental compositions.

Hand-fish. See *Cheironectes.*

Handicapping, in horse-racing and various other games and sports, a system of equalizing the chances of victory in favor of each of the competitors by allowing certain advantages to an inferior competitor, as, in horse-racing, the making the best horses carry heavier weights proportionably to their racing qualities, or, in chess-playing, the stronger player giving up one or more of his men at the beginning of the game.

Hand-language. See *Deaf and Dumb.*

Hand-plant, the *Cheirostēmon platanoides*, a Mexican tree of the order Sterculiaceæ. It grows about 30 feet or more in height, and has flowers, the stamens of which present an appearance somewhat like that of the human hand.

Hands, Laying on of. This rite, as a token of blessing, or the communication of spiritual gifts, or of something else which could not be literally delivered into the hands of another, has been in use from the earliest times. It occurs in Scripture as a patriarchal usage, appropriate and becoming perhaps rather than strictly religious, but later assumes more of the character of a formal rite, as in the ritual of animal sacrifice amongst the Jews, when the officer was required to lay his hands on the victim while still alive, except in the case of the paschal lamb. In the early church this rite was used in benediction, absolution, the unction of the sick, and the reconciliation of penitents as well as in ordination and confirmation. The rite is still retained by most western churches in the ceremony of ordination, and in the Roman Catholic, Anglican, and Lutheran churches both in confirmation and ordination.

Hang-Chow (häng'chou'), or Hang-Choo, a large city, capital of the province of Chekiang, China, on the estuary of the Tsien-tang-kiang. It is one of the handsomest cities of China, with many magnificent temples, monuments, and triumphal arches. It has extensive manufactures in silks, furs, gold and silver ornaments, tapestries, lacquered ware, fans, etc., and a large trade. The larger portion of the inhabitants live without the walls in the beautiful suburbs and in boats on the river. It is also a great center of literary and ecclesiastical life. Pop. estimated at 800,000.

Hanging, as a mode of execution. See *Capital Punishment.*

Hanging-buttress, in architecture, a buttress not standing solid on a foundation, but supported on a corbel. It is applied chiefly as a decoration.

Hanging-buttress.

Hanging Gardens. The Hanging Gardens of Babylon were anciently reckoned among the wonders of the world. Their construction has been variously ascribed to the legendary Queen Semiramis and to Nebuchadnezzar. Diodorus and Strabo have given descriptions of them. They are said to have formed a square, with an area of nearly four acres, and rose in terraces, supported on masonry arches, to a height of 75 feet. They were irrigated from a reservoir built at the top, to which water was lifted from the Euphrates by a screw.

Hang-nest (*Icteridæ*), a popular name given to the American orioles, a family of finch-like perching birds, of brilliant black and color, the best known being the Baltimore oriole. They are so called from their curious purse-like nests, often about two feet long, with a hole for entrance near the bottom. See *Oriole*.

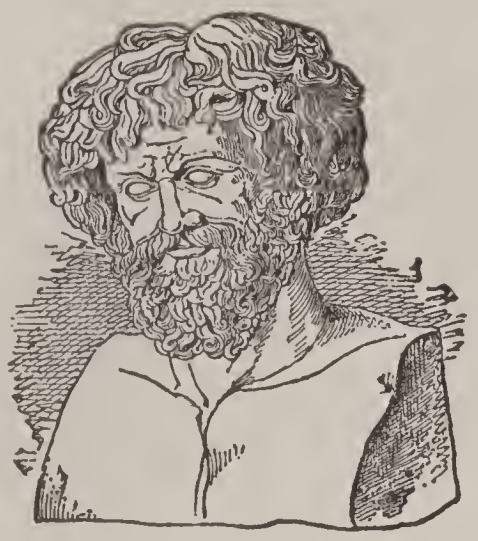
Hankow (hän'kou'; 'Mouth of the Han'), a town and river-port in China, in the province of Hupeh, at the junction of the Han with the Yang-tse-kiang; Han-yang being on the opposite bank of the Han, and Wuchang on the other side of the Yang-tse. The port was opened to foreign trade in 1862, and has become the chief emporium for the green-tea districts in the central provinces, which formerly sent their produce for export to Canton. Large steamers ascend to the town. In 1857 Hankow fell into the hands of the Taiping rebels, and was almost completely demolished by them. Pop. estimated at 850,000.

Hanley (han'li), a municipal and parliamentary borough of North Staffordshire, England, pleasantly situated on rising ground near the Trent, 18 miles north by west of the county town of Stafford. It is quite a modern town, owing its growth entirely to the vast manufactures of china and earthenware in which the inhabitants are mostly employed; but there are also iron-furnaces, foundries, brickworks, and several important collieries. Pop. (1911) 66,264.

Hanna (han'a), MARCUS ALONZA, senator, born at Lisbon, Ohio, in 1837; died in 1904. He grew wealthy in business, became active in political affairs, was chairman of the National Republican Committee in 1896, managed the McKinley presidential campaign, and was elected United States Senator in 1897. He continued chairman of the committee in the campaign of 1900.

Hannay, JAMES, a Scotchman of letters, born at Dumfries in 1827; died at Barcelona in 1873. At an early age he entered the navy, but left it in 1845 to become a reporter on the *Morning Chronicle* in London. In 1860 he went to Edinburgh as editor of the Edinburgh *Courant*, but resigned this post in 1864. In 1868 he was appointed British consul at Barcelona. He wrote several novels, among which *Singleton Fontenoy* and *Eustace Conyers* are the best; also, *Lectures on Satire and Satirists*, *Studies on Thackeray*, and a *Course of English Literature*.

Hannibal (han'ni-bal), or ANNIBAL, one of the greatest generals of antiquity, born B.C. 247, was the son of Hamilcar Barca, also a general and leader of the popular party among the Carthaginians. He was but nine years of age when his father made him swear at the altar eternal hatred to the Romans. He grew up in his father's camp in Spain (see *Hamilcar*), but returned to Carthage when his father fell in battle, in 229 B.C.



Hannibal.

At the age of twenty-two he returned to the army in Spain, then commanded by his brother-in-law Hasdrubal, and three years after, on the murder of Hasdrubal, received the chief command by acclamation. Hannibal now prepared to carry out his great designs against Rome. His siege and capture of Saguntum, a city in alliance with Rome, led to a declaration of war from the Romans, who made preparations to carry on the war in Spain. But Hannibal, judging that Rome could be overthrown only in Italy, undertook his great march on Rome across the Pyrenees, the Rhône, and the Alps. He set out with 90,000 foot-soldiers, 40 elephants, and 12,000 horsemen. When he reached the northern foot of the Alps he had still 50,000 foot-soldiers, 9000 horse, and 37 elephants. When he arrived at the southern foot, after 15 days of incredible toils, his force had diminished to 20,000 foot-soldiers and 6000 horse. The point at which he crossed is generally believed to have been the Little St. Bernard. On the banks of the Ticino he first encountered a Roman army under Publius Scipio, and defeated it mainly by the superiority of his Numidian cavalry, 218 B.C. Shortly after another Roman army, under Sempronius, was totally routed on the Trebia. After wintering in Cisalpine Gaul, Hannibal opened next year's campaign (217) by defeating the Roman general Flaminius, whom he enticed into an ambush at Lake Thrasymenus. In this battle half the Roman army perished, and

the rest were taken prisoners. Hannibal now marched into Apulia, spreading terror wherever he approached. Rome, in consternation, proclaimed Fabius Maximus dictator, who sagaciously resolved to hazard no more open battles, but exhaust the strength of the Carthaginians by delay. But for some time the wisdom of this policy was not understood by his countrymen, who, dissatisfied with his inactivity, appointed Minutius Felix his colleague. The result was that the latter was drawn into a battle by Hannibal, and would have perished but for the aid of Fabius. After this the Roman generals avoided engagements, and Hannibal at this critical period saw his army wasting away in inactivity. Next year (216), however, the rashness of the new consul Terentius Varro gave Hannibal the last of his great victories. The battle was fought at Cannæ, the Romans under L. Æmilius Paulus and Varro numbering more than 80,000 men, the Carthaginians about 50,000, and ended in a total defeat of the Romans, 40,000 or 50,000 of whom were slain and the rest scattered. Instead of marching on Rome, Hannibal now sought quarters in Capua, where luxurious living undermined the discipline and health of his troops. The campaigns of 215, 214, and 213 were comparatively unimportant. While Hannibal was seizing Tarentum (212), Capua was invested by two Roman armies. To relieve Capua Hannibal marched on Rome, and actually appeared before its gates (211), but the diversion remained fruitless, and Capua fell. In 207 a reinforcement tardily sent by the Carthaginians to Hannibal, under command of his brother Hasdrubal, was intercepted by the Romans and destroyed at the Metaurus. Hannibal now retired to Bruttium (the toe of Italy), where he still maintained the contest against overwhelming odds, till, in 203, he was recalled to defend his country, invaded by Scipio. In Africa he was defeated by the Romans at Zama (202 B.C.), and the second Punic war ended, after a bloody contest of eighteen years, in Carthage having to accept the most humiliating conditions of peace. Hannibal now devoted himself as civil magistrate to restoring the resources of Carthage, and was working at reforms of administration and finance when the jealous Romans sent ambassadors to demand his surrender. He fled to the court of Antiochus of Syria, and offered his services for the war then commencing against the Romans. They were accepted, but Hannibal's advice for the conduct of the war was not followed, and he himself as commander of the Syrian fleet failed in an expedition against the Rhodians. In 190 B.C. Antiochus was forced to conclude a disgraceful peace with the Romans, one of the terms of which was that Hannibal should be delivered up. Hannibal, again obliged to flee, took refuge with Prusias, king of Bithynia, and is said to have gained several victories for Prusias against Eumenes, king of Pergamus, an ally of the Romans. But the Roman senate once more sent to demand the surrender of their inveterate enemy, and Hannibal, finding that Prusias could not protect him, took poison rather than fall into the hands of the Romans. He died in B.C. 183.

Hannibal, a city of Marion County, Missouri, on the right bank of the Mississippi, 150 miles above St. Louis. It has Portland cement and shoe factories, car-wheel, stove, and powder works, pork-packing establishments, saw and flour mills, and an extensive trade in lumber. Pop. 18,341.

Hanno (han'nō), a Carthaginian navigator of the fifth and sixth centuries B.C., who made a voyage on the western coast of Africa for the purpose of discovery and of settling colonies. He wrote an account of his voyage, which still survives in a Greek translation known as the *Periplus of Hanno*. From this account Hanno would appear to have gone as far as the coast of Guinea.

Hanoi (hä-noi'), or KESH'O, capital of Tonquin, on the river Songka, in a fruitful plain. Gold and silver filigree, lacquered wares, silks, mat and basket weaving are its principal industries. Although the river is navigable only for small vessels the trade of Hanoi is considerable, chiefly with the southern provinces of China. Pop. variously estimated at over 100,000.

Hanover (han'ō-vẽr; Ger. *Hannover*), formerly a kingdom in the northwest of Germany, now a province of Prussia. It is of very irregular shape, and is divided by intervening territories into three distinct portions, besides some small territories to the south, and a range of sandy islands lining the coast. The total area is 14,857 sq. miles. For administrative purposes it is divided into six districts—Hanover, Hildesheim, Lüneburg, Stade, Osnabrück, Aurich. The surface in the south is covered by the Harz Mountains, but the rest of the country is a low, monotonous flat, with a gentle slope to the North Sea. The Ems, the Weser (with its tributaries the Leine and Aller), and the Elbe flow through fertile districts industriously cultivated for corn and flax. Near the coast the land is marshy, but feeds large numbers of very superior cat-

tle. In Central Hanover the soil is of a barren, sandy nature. The Harz Mountains are rich in minerals, the working of which is an important industry.—Hanover was long connected with the Brunswick family, and latterly more especially with the line of Brunswick-Lüneburg. Ernest Augustus, a prince of the latter line, became in 1692 the first Elector of Hanover, married a granddaughter of James I of England, and was succeeded in 1698 by his son, George Louis, who in 1714 became George I of England. Henceforth it was ruled in connection with England. In 1814 the Congress of Vienna raised Hanover to the rank of a kingdom, the crown of which was worn by George IV and William IV, but on the accession of Queen Victoria, passed by Salic law to Ernest Augustus, duke of Cumberland. In 1851 he was succeeded by his son, George V, but in 1866, Hanover having become seriously involved in the Austro-Prussian contest, his kingdom was conquered and absorbed by Prussia. Pop. (1905) 2,759,699.

Hanover, capital of the Prussian province of Hanover, situated in an extensive plain on the Leine, which here receives the Ihme and becomes navigable. The old town, irregularly built and with many antiquated buildings, is surrounded by the handsome new quarters which have arisen to the north, east, and southeast. There are fine promenades, and a large wood with beautiful walks, the Eilenriede, lies on the eastern side of the city. Amongst the principal buildings are the Market Church, the old town-house, the theater, one of the finest in Germany, the royal palace, the Museum of Art and Science, the Royal Library, containing 175,000 volumes, the Central Railway Station, the Waterloo Monument, etc. About a mile to the N. W. is Schloss Herrenhausen, the favorite residence of George I, George II, and George V. Nearer the town is the colossal Welfenschloss, or palace of the Guelphs, now fitted up as a polytechnic school. Hanover is a manufacturing town of some importance, has cotton-spinning, machine works, iron foundries, chemical works, tobacco and cigar factories, etc. Hanover is first mentioned in 1163. It joined the Hanseatic League in 1481. It became the residence of the dukes of Brunswick-Lüneburg, and capital of the principality in 1636. Pop. (1905) 250,032.

Hanover, a village of Grafton County, New Hampshire, near the Connecticut River and 55 miles N. W. of Concord. It is chiefly notable as the seat of Dartmouth College, founded in 1769 and prominent among our collegiate institutions. Pop. 2075.

Hanover, a borough of York County, Pennsylvania, 26 miles S. W. of York. It has foundries, machine shops, cigar-box, wire, cloth, glove, and various other factories. Pop. 7057.

Hanse Towns (hans), certain German and other commercial cities of Northern Europe formerly associated for the protection of commerce and united by what was called the *Hanseatic League.* In the middle of the thirteenth century the sea and land swarmed with pirates and robbers. In particular the thriving ports of the Baltic and the North Sea were infested, and in 1219 a compact was made between Hamburg, Ditmarsh, and Hadeln to protect the adjacent waters. This was followed in 1241 by an alliance between Hamburg and Lübeck to keep open the road across Holstein, connecting the North Sea with the Baltic. In 1247 this league was joined by Brunswick, and out of this grew the Hansa or league, which at its most flourishing period embraced 85 towns, maritime and inland, from Reval and Narva to Amsterdam and Middleburg, and from Cologne to Breslau and Cracow. Among these the town of Lübeck was recognized as the chief town of the league. Here assembled the deputies of the other Hanse towns to deliberate on the affairs of the confederacy; but the decrees of the diet had no effect unless they received the sanction of the separate towns. The chief trading centers of the league were the factories of Novgorod in Russia, Bergen in Norway, Bruges, and London (the so-called Steelyard). These factories were subject to an almost monastic discipline, which even required their officers to be celibates and live at a common table. During the latter half of the fourteenth century the power of the league was at its height. It had armies and navies, gained victories in war over the kings of Norway and Denmark, and deposed a king of Sweden. It made thorough provision for the security of commerce on the Baltic and North Seas, constructed canals, introduced a uniform system of weights and measures, and developed the principles of mercantile law. But as its power and ambition increased it was felt to be an oppressive monopoly established mainly in the interests of the great seaport towns. It became less needful also for commercial security, as the princes learned the advantages of trade, formed naval forces of their own, and encouraged navigation. Most of the inland members of the confederation withdrew, and during the fifteenth and sixteenth

centuries the cities of Hamburg, Lüneburg, and Lübeck were almost alone in their active efforts to maintain the power of the Hansa and secure for it the command of the Baltic. About the middle of the sixteenth century the Dutch became predominant in the Baltic trade. In 1597 England revoked all special privileges of the Hanseatic merchants, and in 1614 Lübeck, Stettin, Danzig, Brunswick, Lüneburg, Hamburg, Bremen, and Cologne, with a few smaller towns, were the only places that contributed to the support of the Hansa. The league still made desperate efforts to retain its monopolies, but the cost of doing so now became a heavy tax on the remaining allies. At the last general assembly, held in 1630 at Lübeck, many of the members sent representatives only to renounce their allegiance. The name still remained attached to the free cities of Lübeck, Bremen, and Hamburg, under whose protection the surviving factories continued to exist, that of Bergen being still managed in the old way till 1763. In 1813 Frankfort-on-the-Main was included in the number of the Hanse towns, and in the German Confederation these four cities had together one vote in the diet. Frankfort was incorporated with Prussia in 1866, but the other three towns are still separate constituents of the German Empire.

Hansi (hän'sē), a town of Hissar district, Punjab, on the western Jumna Canal. Pop. about 15,000.

Hansom-cab, a two-wheeled hackney carriage or cabriolet used in the cities and large towns of Britain and the United States, and named after the inventor. It holds two persons besides the driver, who sits on an elevated seat behind the body of the carriage, the reins being brought over the top.

Hanswurst (hän s'wurst), the name of a standing comic character on the older German stage, corresponding in its grotesque traits and mirth-making qualities to the English clown or Italian harlequin. The name is equivalent to the Jack Pudding of England.

Hants. See *Hampshire.*

Hanumân (han-ö-mân'), in Indian mythology, the name of a fabulous monkey-god, who plays a prominent part in the epic Râmâyana. As the monkey-general who aided Rama (the seventh incarnation of Vishnu) in his war against the giant Ravana, he is worshiped as a demi-god, and on his account the whole tribe of monkeys, to which he is fabled to belong, is treated as sacred and allowed to multiply indefinitely.

Hanway (han'wā), Jonas, an English traveler and philanthropist, born in 1712. At an early age he was apprenticed to a merchant at Lisbon, and in 1743 became a partner in a British house at St. Petersburg. He traveled in Persia, and published *An Historical Account of the British Trade over the Caspian Sea.* Later he settled in London, where he became widely known as an active philanthropist. He is popularly known as one of the first Englishmen to persist in the regular use of an umbrella. He died in 1786.

Hapsburg (haps'burg; properly *Habichtsburg* or *Habsburg*, the hawk's castle), a small place in the Swiss Canton of Aargau, on the right bank of the Aar. The castle was built about 1027 by Bishop Werner of Strassburg. Werner II, who died in 1096, is said to have been the first to assume the title of Count of Hapsburg. After the death, about 1232, of Rudolph II, the family divided into two branches, the founder of one of which was Albert IV. In 1273 Rudolph, son of Albert IV, was chosen Emperor of Germany, and from him descended the series of Austrian monarchs all of the Hapsburg male line, down to Charles VI inclusive. After that the dynasty, by the marriage of Maria Theresa to Francis Stephen of Lorraine, became the Hapsburg-Lorraine. Francis II, the third of this line, was the last of the so-called 'Holy Roman Emperors,' this old title being changed by him for that of Emperor of Austria. From the Emperor Rudolph was also descended a Spanish dynasty which began with the Emperor Charles V (Charles I of Spain), and terminated with Charles II in 1700. The castle of Hapsburg is still to be seen on the Wülpelsberg.

Hapur (hạ-pör'), a town of India, in the Meerut district, North-western Provinces. It has a considerable trade in sugar, grain, cotton, timber, etc. Pop. about 18,000.

Harakiri (har'a-ki-ri), or Sep'puku, a mode of inflicting death upon themselves allowed in Japan to criminals of the Samurai or two-sworded class as more honorable than public execution. It consists in cutting open the body so as to disembowel it by means of a wound made with one sword perpendicularly down the front and another with the other sword horizontally. It is (or was) frequently resorted to to save dishonor or exposure, and was done by the Japanese to prevent capture in war.

Harar (ha-rär'), a city of Northeastern Africa, about 150 miles from the coast of the Gulf of Aden. It is the center of a small district governed as an independent sovereignty by an emir. The inhabitants are strict Mohammedans. Pop. variously estimated from 30,000 to 40,000.

Harbin (hår'bin), or KHARBIN, a railway town on the Sungari River, in Northern Manchuria, 615 miles N. E. of Port Arthur, 350 miles N. W. of Vladivostok. It was founded by Russia in 1896 at the junction of the Trans-Siberian Railway with the South Manchurian line to Port Arthur, as a railway and military center, and has now a population estimated at over 30,000. It has steamboat connection via the Sungari with the Amur and is a trading center. In 1904 it was an important depôt of supplies for the Russian army during the war with Japan.

Harbor (hår'bur), a general name given to any bay, creek, or inlet of the sea affording accommodation for ships and protection against the wind and sea. The great requisites of a good harbor are accessibility, adequate depth of water, and shelter from violence of wind and water. Harbors are either natural or artificial, the latter being made wholly or partly by the construction of moles or breakwaters. In connection with the more important harbors there are usually docks, in which the water is kept as nearly as possible at the same level, thus giving facility in loading and unloading. See *Breakwater* and *Docks*.

Harbor Grace, a seaport of Newfoundland, on the west side of Conception Bay. It is the seat of a Roman Catholic bishop, has a handsome cathedral, and an active trade. Pop. 5184.

Harburg (här'bourg), a town in Prussia, in the province of Hanover, on the left bank of the South Elbe, opposite to Hamburg. It has varied manufactures and an important trade. Pop. (1905) 55,676.

Harcourt (hår'cört), SIR WILLIAM GEORGE GRANVILLE VENABLES VERNON, lawyer and politician, son of the late Rev. William Vernon Harcourt, was born in 1827. He was educated at Trinity College, Cambridge, was called to the bar in 1854, became Queen's Counsel in 1866; contributed frequently to the press, in particular the letters to the *Times* signed 'Historicus.' He was returned for Oxford city in 1869 in the Liberal interest and distinguished himself by his powers of satire and ridicule in debate; was made solicitor-general in Mr. Gladstone's ministry, Nov., 1873; home secretary in 1880, when he lost his seat for Oxford but was returned for Derby. In Feb., 1886, he was made chancellor of the exchequer; and after the resignation of Mr. Gladstone's ministry became a prominent leader of the Gladstonian section; in 1892 he was reappointed chancellor of the exchequer. He died in 1904.

Hardangerfjord (hår-dång'ĕr-fyord), a fjord on the west coast of Southern Norway, with magnificent scenery.

Hardee (hår'dē), WILLIAM J., soldier, born at Savannah, Georgia about 1818; graduated at West Point in 1838; became captain in 1844. and joined the Confederate army in 1861. He served as major-general at the battle of Shiloh, and was appointed lieutenant-general in October, 1862. He fought at Stone River and in several later battles, and unsuccessfully defended Savannah against Sherman in 1864. His work on *Tacties* was long an authority. He died in 1873.

Hardenberg (hår'den-bĕrg), FRIEDRICH VON, German writer, better known under the name of *Novalis*, was born in 1772; died in 1801. He studied at Jena, Leipzig, and Wittenberg, was the friend of Tieck and the Schlegels, and spent his brief life in study and literary production. He was one of the leaders of the 'romantic school,' and his writings are a strange mixture of imagination, profundity and mysticism. Amongst his works are an unfinished novel, *Heinrich von Ofterdingen*, and *Spiritual Songs*.

Hardenberg, KARL AUGUST, PRINCE VON, Prussian chancellor of state, was born at Essenrode, in Hanover, in 1750. He entered the civil service of his country, but left it for that of Brunswick, and next became Prussian minister of state, and in 1804 first minister of Prussia. His conduct was vacillating, now favoring an alliance with Napoleon and again hostile to him. After the Peace of Tilsit, he was banished from the Prussian court by command of Napoleon, was recalled to office as chancellor in 1810, and after the French disaster at Moscow was amongst the first to declare that the time had now come for a general effort against Napoleon. Hardenberg signed the Peace of Paris, and was created prince. He was one of the most prominent actors at the Congress of Vienna; became president of the Prussian council of state; was present in 1818 at the Congress of Aix-la-Chapelle; in 1819 at Carlsbad; in 1820 at Troppau; in 1820-21 at Laibach; and in 1822 at Ve-

ro[illegible]. He died in 1822. He abolished feudal privileges in Prussia, and was a munificent patron of the sciences.

Harderwijk (hår'dĕr-vīk), a town of the Netherlands, in the province of Gelderland, on the Zuider Zee, 30 miles east of Amsterdam. Pop. 7425.

Hard-hack, the American popular name of a plant, the *Spiræa tomentosa*, common in pastures and low grounds, and celebrated for its astringent properties, which cause it to be used medicinally.

Hardicanute (hår-di-kå-nūt'), or HARTHICANUT, King of England and Denmark, was the only legitimate son of Canute. At the time of his father's death, in 1036, he was in Denmark, where he was immediately recognized as king. His half-brother Harold, however, who happened to be in England at the time, laid claim to the throne of that part of their father's dominions, and succeeded in getting possession of Mercia, Northumbria, and Wessex, but died in 1040, when Hardicanute peacefully succeeded him. He reigned till 1042, leaving the government almost entirely in the hands of his mother and the powerful Earl Godwin, while he gave himself up to feasts and carousals.

Hardinge (hår'ding), HENRY, VISCOUNT, an English commander, was a son of the Rev. Henry Hardinge, rector of Stanhope, Durham,

Viscount Hardinge.

and was born in 1785. He was gazetted ensign in 1798, and was present at all the great battles and sieges in the Peninsula. He lost his left hand at the battle of Ligny. He became M. P. for Durham in 1820, was made secretary-at-war, secretary for Ireland, and in 1844 succeeded Lord Ellenborough as governor-general of India. Being forced into war by an invasion of Sikhs he took a command under Lord Gough, and after the great battles of Mudki, Ferozeshah, and Sobraon dictated a peace in the Sikh capital of Lahore. In reward of his services he was created Viscount Hardinge and received a pension of £3000. In 1852, on the death of the Duke of Wellington, he succeeded to the post of commander-in-chief. In 1855 he was made a field-marshal, and he died in 1856.

Hardness (hård'nes), the quality of bodies which enables them to resist abrasion of their surfaces. In mineralogy a scale is used in which a set of standard bodies are arranged and numbered, and other bodies are referred to this scale with respect to hardness. The following is the scale given by F. Mohs:—talc 1, rock-salt 2, calcspar 3, fluorspar 4, apatite 5, felspar 6, quartz or rock-crystals 7, topaz 8, corundum 9, diamond 10. Materials, according to this arrangement, which are scratched by rock-crystal and are not scratched by felspar are said to have a hardness between 6 and 7.

Hardoi (hur'dō-ē), a town of India, administrative headquarters of Hardoi district, Oudh, 63 miles from Lucknow. Pop. 12,174.

Hardouin (år-dö-aṇ), JEAN, a learned French Jesuit, born in 1646; died in 1729. He maintained the extraordinary hypothesis that all the writings under the names of the Greek and Roman poets and historians, except those of Homer, Herodotus, Cicero, and Pliny the Elder, the satires and epistles of Horace, and the Georgics of Virgil, are the spurious productions of the thirteenth century, written by monks under the direction of one Severus Archontius.

Hardpan, a strata of hardened clay, sand, or gravel, several feet under the soft upper soil, for which it serves as a foundation, and aids in holding water. It has become a popular term for the lowest point of descent in any state of affairs.

Hardtack, large, hard biscuits or crackers made for the use of soldiers on the march. About 14 of these weigh a pound and about 20 are served daily to marching soldiers.

Hardwar (hur-dwär'), a town of India, in Saharanpur district, Northwestern Provinces. It is situated on the Ganges, and is one of the principal places of Hindu pilgrimage, and of the ceremonial of bathing in the sacred

river. The town is of great antiquity and has interesting ruins. Pop. 25,597.

Hardware (hȧrd′wār), the name usually given to the commoner articles made of iron, brass, and copper. The manufacture of such articles now forms a gigantic industry in Great Britain, especially in England, where its chief seats are Birmingham and Sheffield.

Hardwood Trees, are usually trees of slow growth, such as the oak, beech, witch-elm, elm, ash, service-tree, walnut, chestnut, acacia, etc., the tissue of which is firm and close. They are distinguished from soft-wooded trees such as the willow, poplar, etc., and resinous trees such as the pine, fir, cedar, larch, etc.

Hardy (hȧr′di), Thomas, novelist, born in Dorsetshire, England, in 1840. He served an apprenticeship as an ecclesiastical architect; published his first novel, *Desperate Remedies*, in 1872, and has since continued a series of favorite fictions. His best known work is *Far from the Madding Crowd*, with its fine air of rural life. Others are *The Hand of Ethelberta*, *The Trumpet Major*, *The Woodlanders*, *The Return of the Native*, *The Mayor of Casterbridge*, *Tess of the D'Urbervilles*, etc.

Hare (hār), the common name of the rodent quadrupeds of the genus *Lepus* with long ears, long hind limbs, a short tail, soft hair, and a divided upper lip; its dental formula is: incisors $\frac{4}{2}$, canines $\frac{0}{0}$, molars $\frac{6}{5}-\frac{6}{5}=28$; the two forefeet have five and the hinder four toes. They run by a kind of leaping pace. The females produce litters of three to six about four times a year. The young leverets have their eyes open at birth. The common hare (*L. timidus*) is found throughout Europe and some parts of Asia. It is tawny red on the back and white on the belly, and is about 2 ft. long. The mountain hare or varying hare (*L. variabilis*), confined to Northern Europe and the mountainous regions of the south, is smaller than the common hare, and becomes white in winter. *L. cuniculus* is the rabbit, properly so called, distinguished by its smaller size and burrowing habits. (See *Rabbit.*) The American hare (*L. Americanus*), not much larger than a rabbit, is found in most parts of North America. In North America there are also the polar hare (*L. glacialis*), a variety of the varying hare (*L. variabilis*), but of superior size and purer color; and the prairie hare (*L. campestris*), one of the species known as jackass hares or Jack-rabbits, from their size and length of limb. The hare, which has no courage and little cunning, is protected from its enemies mainly by the acuteness of its sight and hearing and its extraordinary swiftness of foot. Its voice is never heard except when seized or wounded, when it utters a sharp loud cry, not very unlike that of a child. Its flesh is rather dry, but is much prized for its peculiar flavor.

Hare, Julius Charles, an English writer on theological and social subjects, born in 1796; died in 1855. He was educated at the Charterhouse, and Trinity College, Cambridge. In 1832 he became rector of Herstmonceaux, in 1840 was appointed Archdeacon of Lewes, in 1851 obtained a prebend in Chichester Cathedral, and in 1853 became one of the queen's chaplains. In concert with his brother, Augustus William Hare, he published a well-known work entitled *Guesses at Truth by Two Brothers*. His other writings include several volumes of sermons; a *Memoir of John Sterling*, prefixed to a collection of his writings; and a *Vindication of Luther Against His Recent English Assailants*.

Hare, Robert, chemist, born at Philadelphia, Pennsylvania, in 1781; died in 1858. He was professor of chemistry in the University of Pennsylvania, 1818-47, and gained fame by the invention of the oxyhydrogen blowpipe. He also invented the valve-cock, the calorimeter, etc. He investigated spiritualism and became convinced of its truth, being the first scientist to accept it.

Harebell (hār′bel), the Scotch Bluebell (*Campanŭla rotundifolia*), a plant of the nat. order Campanulaceæ, common on dry and hilly pastures, by roadsides, etc., in most districts of Europe, with a bell-shaped blue (sometimes white) flower. The radical leaves are cordate or reniform, the stem-leaves partly ovate or lanceolate, partly linear. Its slender stem is from 4 to 6 inches high, and bears sometimes a single flower. Several American species of *Campanŭla* are known to all lovers of wild flowers.

Harebell.

Hareld (har′eld; *Harelda glacialis*), the long-tailed duck, an oceanic duck having a short thick bill, a high forehead and two very long feathers in the tail of the male, whilst the females have the tail short and rounded. It inhabits the northern seas, and is frequent in Orkney and Shetland.

Harelip, a malformation consisting in a fissure or vertical division of the upper lip, sometimes extending also to the palate. Children are frequently born with this malformation, and the cleft is occasionally double. The name is given from the imagined resemblance which the part has to the upper lip of a hare. The cure of harelip is performed by cutting off quite smoothly the opposite edges of the fissure, and then bringing them together and maintaining them in accurate apposition till they have firmly united.

Harem (hā′rem, ha′rem; Ar., 'the prohibited'), is used by Mussulmans to signify the women's apartments in a household establishment, forbidden to every man except the husband and near relations. The women of the harem may consist simply of a wife and her attendants, or there may be several wives and an indefinite number or concubines or female slaves, with black eunuchs, etc. The greatest harem is that of the Sultan of Turkey. The women of the imperial harem are all slaves, generally Circassians or Georgians. Their life is spent in bathing, dressing, walking in the gardens, witnessing the voluptuous dances performed by their slaves, etc. The women of other Turks enjoy the society of their friends at the baths or in each other's houses, and appear in public accompanied by slaves and eunuchs; but the women of the sultan's harem have none of these privileges. It is of course only the richer Moslems who can maintain harems; the poorer classes have generally but one wife.

Hare's Ear (*Bupleurum*), a plant of the nat. order Umbelliferæ. The most common European species (*B. rotundifolium*) flourishes best on a chalky soil. Under the name of *thorough-wax* it was at one time used as a vulnerary.

Harfleur (ar-fleur), a town of France, dep. of Seine-Inférieure, on the Lezarde, near its entrance into the Seine, 6 miles east of Havre, once the chief port at the mouth of the Seine. Pop. 2612.

Hargreaves (hår′grēvz), Edmund X, explorer, born in Gosport, England, in 1815; became a gold-digger in California in 1849, and being struck with the similarity in geological formation between California and Australia, believed that gold existed in the latter. This he proved in 1856 by discovering gold in the Blue Hills of New South Wales. He was appointed commissioner of crown lands and received an award of $50,000. He died in 1891.

Hargreaves (hår′grēvz), James, an English inventor, author of two important improvements in the art of cotton-spinning, was born near Blackburn about 1720; died in 1778. In 1760 he invented a machine for carding, and some years after the spinning-jenny, by which he was able to spin with several spindles at once.

Haricot (har′i-kō), a general term for various species of kidney-bean, genus *Phascŏlus*. They constitute a palatable and nutritious article of diet.

Häring (hā′ring), Wilhelm, best known as Wilibald Alexis, a German novelist, born in 1797; died in 1871. He adopted law as a profession, but gave it up in favor of literature. In 1823 and 1827 respectively he published the novels *Walladmor* and *Schloss Avalon*, which were translated into English and other languages. These were followed by a long series of writings, consisting not only of novels and novelettes, but of books of travel, plays, ballads, etc. His most important works, however, were historic novels, such as *Cabanis*, *Roland von Berlin*, *Der Falsche Waldemar*, etc.

Harington (har′ing-tun), Sir John, an English poet of some merit, born in 1561; died in 1612. At his baptism Queen Elizabeth stood sponsor. He was in 1596 excluded from court on account of his poem *Metamorphoses of Ajax*, but was soon allowed to return. His best-known performance is, perhaps, his translations of *Orlando Furioso* in heroic verse.

Harîri (har′ē-rē), Abu Mohammed el Kasem Ben Ali, surnamed El Harîri, or the silk merchant, his father's occupation, a celebrated Arabic scholar and poet, who lived chiefly at Bassorah in the time of the Abbasside caliphs, born A.D. 1054; died 1121 or 1123. He is best known by his *Mekâmmât*, a collection of tales narrated as incidents in the life of the hero *Abu Zeid*, a clever impostor who adopts every career in life, and succeeds in all to admiration.

Harlan, John Marshall, American jurist, born in Kentucky in 1833; died in 1911. In 1861 he organized the Tenth Kentucky Regiment, of which he was colonel until 1863, when he became attorney-general of Kentucky. In 1877 he became an Associate Justice of the United States Supreme Court, in which position he showed himself a liberal constructionist. In 1889 he became professor of law in the George Washington University. He was a member of the Bering Sea Tribunal in 1893.

Harland, Marion. See *Van de Water Virginia.*

Harlebeke, or HAERLEBEKE (här'-le-bā-ke), a town in Belgium, in West Flanders, on the Lys. It is said to be the oldest town in Flanders, and has a beautiful parish church, and a pulpit regarded as a masterpiece of carving. Pop. 7386.

Harleian Library. *See Harley.*

Harlequin (hår'le-kwin; Fr. *arlequin;* Ital. *arlecchino*), a character of the Italian comedy. On the Italian stage he is a comic character, full of drolleries, tricks, and knaveries, and somewhat resembles the English clown. The harlequin of British pantomimes is quite different. He is supposed to be the lover of the columbine, and

Robert Harley, Earl of Oxford.

possesses a wonder-working wand, with which he protects his mistress against the clown and pantaloon, who pursue and endeavor to capture her, until the pursuit is brought to a termination by a good fairy. The harlequin wears a tight dress of bright colors, and glittering with spangles. See *Clown.*

Harlequin Duck (*Clangŭla histrionĭca*), a species of duck, so called on account of its party-colored plumage of white, gray, and black. It inhabits the Arctic regions. At Hudson Bay it is called the *Painted Duck;* along the coast of New England the *Lord.* In length it is about 17 inches.

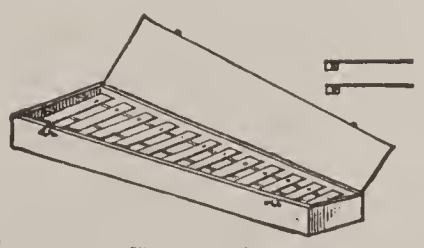
Harley (hår'li), ROBERT, Earl of Oxford, an English minister, born 1661; died 1724; the son of Sir Edward Harley. After the accession of Anne he and his colleague St. John, afterwards Lord Bolingbroke, became leaders of the Tories. Harley was chosen speaker of the House of Commons in 1702 under Rochester, and in 1704 was appointed chief secretary of state, but resigned in 1708. After the fall of Marlborough Harley became chancellor of the exchequer in 1710, and next year was created Earl of Oxford. He and Bolingbroke secured the Treaty of Utrecht (1713), but afterwards quarreled. Early in the reign of George I he was impeached of high treason on the ground of his alleged Jacobite intrigues. He was kept in the Tower for two years, but, owing to the inability of the Peers and the Commons to agree about the mode of procedure he was acquitted. His patronage was extended to Swift, Pope, and other literary men, and he made a valuable collection of books and MSS., which latter are preserved in the British Museum, where they form the *Bibliotheca Harleiana.* Those which have been printed constitute the *Harleian Miscellany.*

Harlingen (hår'ling-en), a seaport of Holland, province of Friesland, intersected by numerous canals. It has a great trade with England in corn, cattle, butter, etc. Pop. 10,448.

Harmattan (hår-mat'an), a hot and dry wind, which, coming from the interior of Africa, prevails at times on the coast of Guinea in December, January, and February. Under its influence vegetation withers, and the grass becomes like hay. It is similar to the simoon of Egypt and the sirocco of Italy.

Harmodius (hår-mō'di-us). See *Hippias* and *Aristogeiton.*

Harmon (hår'mon), JUDSON, governor, was born at Newton, Ohio, in 1846. He studied law, became mayor of Wyoming, Ohio, in 1875; judge of the Court of Common Pleas in 1876 and of the Superior Court in 1878, and in 1895-97 was Attorney-General of the United States in the Cleveland cabinet. He became professor of law in the University of Cincinnati in 1896, and was elected governor of Ohio by the Democratic party in 1909.



Harmonica.

Harmonica (hår-mon'i-ka), Franklin's name for a musical instrument constructed with glasses of different sizes, revolving by means of mechanism

worked by the foot, and played upon by touching the rim of the glasses with the moistened finger. It constituted the 'musical glasses' of Goldsmith's era. The name is now usually applied to an instrument consisting of a series of glass keys played by two small hammers.

Harmonics (hâr-mon'iks), the accessory sounds accompanying the predominant and apparently simple tone of any string, pipe, or other sonorous body. No purely simple sound, *i. e.* no sound whose vibrations are all in the same period, is producible in nature. When a sound is produced by the vibration of an open string, the whole string vibrates as a unity, giving rise to a tone called the fundamental. The string, however, further divides into various sections, which vibrate separately and more rapidly, and produce sounds differing from the fundamental, but bearing certain fixed proportions to it. The first harmonic of the fundamental note of any string is that produced by half the string, and is the octave of the first; the second harmonic is given by the third of the string, and is the fifth or dominant of the fundamental note, and so on, the complete series of harmonics containing all the notes of the musical scale. But while harmonics enter into the composition of any musical sound from any vibrating body whatsoever, the different structure of different instruments suppresses now some now others of the succession of harmonics, and a different body of tone is thus produced, distinguishing a note in one instrument from the same note in another. These differences are called in English *quality*, in French *timbre*, in German *klangfarbe*.

Harmonists (hâr'mon-istz), a religious sect founded at Würtemberg about the year 1788 by two brothers called George and Frederick Rapp. They endeavored to re-establish the social practices of the early Christian church, encouraged celibacy, held all their goods in common, and taught the second advent. Persecuted by their countrymen, the followers of Rapp emigrated to America, and established themselves (1805) successfully at Harmony, in Pennsylvania. They afterwards migrated to Indiana, but this venture not proving successful, they sold their land at New Harmony to Robert Owen, the socialist, and finally settled at a place which they named Economy, 17 miles from Pittsburgh. George Rapp died in 1847, but the community still exists, though reduced to a very small number of members as a result of its policy of celibacy. It has, however, a property of great value.

Harmonium (hâr-mō'ni-um), a musical instrument of modern invention, producing sounds somewhat resembling those of the organ, resulting from the pressure of wind on a series of vibrating metallic reeds. By the action of bellows, to which the feet communicate a more or less rapid movement, the air is made to impinge against thin tongues of metal (here termed *reeds*), and to set them vibrating. These metal tongues are fitted into a slit in the top of a small box or sonorous cavity, called a wind-box, and are enabled to vibrate by being fixed only at one end. The discovery that the form of the wind-boxes determines the quality of the sound produced by the vibration of these metallic tongues contributed very much to the development of the harmonium, as it enabled the player to imitate the sound of the oboe, flute, etc. The instrument has a keyboard like that of a piano, and when one of the keys is pressed down a valve is opened, which allows the wind from the bellows to rush through one of the wind-boxes and act on the vibrator. There are several stops, by means of which the performer can direct the stream of wind into the wind-boxes which produce a flute, clarionet, or any other sound. There is also a knee action, which either serves as an expression stop, or brings all the stops of the instrument into play at once, and what is called the percussion action, which consists in the application of a small hammer, which strikes the vibrator as soon as the key is pressed down, and thus aids the action of the wind. The better class of harmoniums have now usually two or more extra rows of vibrators, which, acted upon by separate stops, add so many octaves to the compass.

Harmony. See *Music* and *Counterpoint*.

Harmony (hâr'mo-ni), Evangelical, or Harmony of the Gospels, the title of works written with a view to prove the substantial agreement of the four evangelists. The heretic Tatian composed in the second century the *Diatessaron*, the first work of this kind, a continuous narrative of the events written in the gospels. From this harmony all passages were omitted which favored the doctrine of the real humanity of Christ, and hence told against the peculiar doctrines of Tatian. Theophilus of Antioch is said to have composed a book of a similar kind, and Ammonius Saccas (died 243 A.D.) executed another *Diatessaron*, with the corresponding passages arranged in parallel columns. The *Ten Indexes* of Eusebius probably appeared in

the first half of the fourth century, and was more complete than its predecessors. Among modern harmonists are Gresswell, Robinson, Tischendorf, etc.

Harmony of the Spheres, an hypothesis of Pythagoras and his school, according to which the motions of the heavenly bodies produced a music imperceptible by the ears of mortals. He supposed these motions to conform to certain fixed laws, which could be expressed in numbers corresponding to the numbers which give the harmony of sounds.

Harmotome (hår'mo-tōm), or CROSS-STONE, a mineral which occurs in right rectangular prisms terminated by four rhombic planes corresponding to the solid angles of the prism; but more frequently in twin-crystals formed by the intersection of two flattened prisms at right angles to each other. Its prevailing color is white, but may be yellow, red, or brown; it is translucent or semi-transparent, with a somewhat pearly luster, and is hard enough to scratch glass. It consists chiefly of silica, alumina, baryta, and water.

Harness (hår'nes), the various articles which are required to yoke a horse or another animal to any vehicle, or to control and suit them for any kind of work. See *Bit, Bridle, Saddle*, etc.

Haroeris. See *Horus.*

Harold I (har'old), or HARALD (*Haarfager;* 'Beautiful-haired'), King of Norway, one of the greatest monarchs of that country, succeeded his father in 863. He brought all the Norwegian jarls under his power, and completely subjected the country, allowing his hair to remain uncut for twenty years until he attained this object (885). Of the conquered jarls, Hrolf, or Rollo, emigrated to Neustria (France); others established themselves in Iceland, the Shetland Isles, the Faroes, and the Orkneys. In consequence of their incursions into his dominions, Harold embarked with a naval force to subdue them, and having conquered the Orkneys, etc., returned home. He fixed his residence at Trondhjem, and died there in 933.

Harold III (*Hardrada*, 'the Hardy'), King of Norway, the son of Sigurd, a descendant of Harold Haarfager. In his youth he went to Constantinople, joined the Varangian Guard, and took part in the expedition to Italy and Sicily against the African pirates. He was ultimately appointed commander of the imperial bodyguard, and defeated the Saracens. About 1042 he returned to Norway, after having, on his way through Russia, married the daughter of the Grand-duke Jaroslav. In 1047 he succeeded his nephew, Magnus the Good, as sole king of Norway. In 1066 he joined Tostig, the brother of Harold II of England, in an invasion of that country, but was defeated and slain at the battle of Stamford Bridge. See *Harold II* below.

Harold I, surnamed *Harefoot*, Danish king of England, succeeded his father Canute in 1035 as king of the provinces north of the Thames, and became king of all England in 1037. His countrymen, the Danes, maintained him upon the throne against the efforts of Earl Godwin in favor of Hardicanute; and Harold later gained the earl over. After a reign of four years, he died in 1040.

Harold II, King of England, born about 1022, was the second son of Godwin, earl of Kent. On the death of Edward the Confessor, January 5, 1066, he stepped without opposition into the vacant throne, without attending to the claim of Edgar Atheling, or the asserted bequest of Edward in favor of the duke of Normandy. The latter immediately called upon him to resign the crown, and upon his refusal prepared for invasion. He also instigated Harold's brother, Tostig, to infest the northern coasts of England in conjunction with the king of Norway. (See *Harold III* above.) The united fleet of these chiefs sailed up the Humber, and landed a numerous body of men; but at Stamford Bridge, in Yorkshire, were totally routed by Harold, whose brother Tostig fell in the battle. Immediately after he heard of the landing of the duke of Normandy at Pevensey, in Sussex. Hastening thither with all the troops he could muster, a general engagement ensued at Senlac, near Hastings, October 14, 1066, in which Harold was slain, and the crown of England passed to William.

Haroun al Raschid. See *Harun al Rashid.*

Harp, a stringed instrument of great antiquity, found among the Assyrians, Egyptians, Hebrews, Greeks, Irish, Welsh, and other nations. Its variety of form and construction was only equalled by its universality. The modern instrument is well known: its form is nearly triangular, and the strings distended from the upper part to one of the sides. It stands erect, and is played with both hands, the strings being struck or pulled with both fingers and thumbs. The instrument in its ancient forms was very defective. Egyptian harps are represented with four, seven, ten, twenty, or

more strings, but we have little idea of the scale to which they were tuned. The frames are depicted as being curved in various forms, and the front pillars are wanting. The harps of the Hebrews were probably similar to the Egyptian instruments. It is probable that the various

Ancient Harps.
1, 2, Egyptian. 3, Assyrian. 4, Anglo-Saxon.

Celtic harps were derived from some oriental pattern. Among the Anglo-Saxons the harp was a favorite instrument. The modern harp was by no means an efficient instrument, until pedals were invented, an invention finally perfected by Sebastian Erard, whose patent was taken out in 1795. In 1810 he patented a double-action harp with seven pedals, each effecting two changes in the pitch of the strings. The harp thus constructed contains forty-three strings tuned according to the diatonic scale, every eighth string being a replicate in another octave of the one counted from.

Harp, ÆOLIAN. See *Æolian Harp.*

Harpe. See *La Harpe.*

Harper, WILLIAM RAINEY, educator; born in New Concord, Ohio, in 1856; graduated at Muskingum College in 1870. He became professor of Hebrew at the Baptist Union Theological Seminary, Chicago, in 1879-1886; of Semitic languages at Yale College in 1886-1891; president of the University of Chicago in 1891. He was very successful in promoting its interests, benefited by the liberal donations of John D. Rockefeller. He died in 1906.

Harper's Ferry, a town of West Virginia, on the Potomac River and at the mouth of the Shenandoah, 81 miles west of Baltimore. The Potomac here passes through a gorge in the Blue Ridge, and the town is notable for the beauty of its scenery and as the seat of memorable events. In 1859, John Brown, the noted abolitionist, captured the United States arsenal at this place, with a view to promote a slave insurrection. He was taken and executed. In 1862 the place was captured by Stonewall Jackson and a large garrison taken prisoners. It was the scene of other events during the Civil war. There is here a college for colored students. Pop. 766.

Harpies (här'pēz), the ancient Greek goddesses of storms. Their parentage, ages, appearance, names, and number are very differently given by the poets. In the Homeric poems they are merely storm-winds. Hesiod represents them as two young virgins of great beauty called Aëllo and Ocypete. The later poets and artists vied with each other in depicting them under the most

Harpy, from an antique gem.

hideous forms, covered with filth and polluting everything in contact with them. They are often represented as having female faces.

Harpoon (här-pön'), one of the principal instruments used for the capture of whales and large fish. See *Whale.*

Harp-seal. See *Seal.*

Harp-shell, the shell of a genus of molluscs (*Harpa*) belonging to the gasteropoda and to the whelk family. The species are found more especially at the Mauritius. The shells are very beautiful, being of brilliant color.

Harpsichord (härp'si-kord), a keyed, stringed in-

strument formerly in use, in appearance and construction similar to a grand pianoforte. In the front the keys were disposed, the long ones being the naturals, and the short ones the sharps and flats. These keys being pressed by the fingers, their inclosed extremities raised little, upright, oblong slips of wood called *jacks*, furnished with crow-quill plectrums which struck the wires, instead of the hammers of the modern pianoforte.

Harpy-eagle (*Thrasaëtus Harpyia* or *Harpyia destructor*), a rapacious bird which inhabits tropical America from Southern Mexico to Southern Brazil. It is an extremely powerful bird, and in total length slightly in excess of the golden eagle. It has, however, a somewhat shorter expanse of wing. Its shoulder muscles possess enormous strength. Its bill is powerful and crooked, and its claws are extremely strong and sharp. The harpy-eagle feeds on birds, sloths, fawns, raccoons, etc., as well as on fish, water-snakes, and the eggs of the tortoise.

Harquebuse (här'k wē-bus). See *Arquebus*.

Harraden, Beatrice, novelist, born in London about 1864. Her novel, *Ships That Pass in the Night* (1893), was very successful. Others from her pen were *In Varying Moods*, *Hilda Strafford*, etc.

Harrier (har'i-ėr), a kind of dog employed to hunt the hare. It closely resembles the foxhound, but is smaller in size.

Harrier, the name of several hawks of the genus *Circus*, allied to the buzzards. They strike their prey upon the ground and generally fly very low. The marsh-harrier, the hen-harrier, and the ash-colored harrier, are found in Europe, and the marsh-harrier (*C. æruginōsus*) in North America and Cuba. It is from 21 to 23 inches long. The hen-harrier (*C. cyanĕus*) is 18 inches to 20 inches long. It is very destructive to poultry-yards, whence the name.

Harriman, Edward Henry, railroad financier, was born at Hempstead, New York, in 1847. He engaged early in the brokerage business in New York and was a member of the Stock Exchange at 22. Active and enterprising as a broker, he engaged vigorously in railroad finance, was made a director of the Illinois Central R. R. in 1883, was later its vice-president and acting president, and in 1898 secured a controlling interest in the Union Pacific R. R. He developed and greatly increased the efficiency of this road. From this basis he rapidly gained control of other roads, by aid of a daring system of financing, using the credit of one road to raise funds to purchase a controlling influence in another. In this way he gained control of the Central and Southern Pacific railroads, the Oregon Railroad and Navigation Co., and made a vigorous effort to absorb the Northern Pacific. He was defeated in this by James J. Hill, the struggle leading to the stock exchange panic of 1901. A few years of this bold and discreditable system of speculation, in which he used the property of others for his own ends, raised him to the position of the railway autocrat of the United States. In 1906 the Interstate Commerce Commission instituted an investigation of his methods, which by the time had given him dominating control of a considerable number of roads, a large interest in others, and a similar interest in many financial institutions, and had brought him enormous wealth. The only public services rendered by him were a marked improvement in the condition of the roads under his control and a scientific expedition which he sent out in 1899 to explore the wastes of Alaska and the North Pacific. He died in 1909.

Harrington (har'ing-tun), James, a celebrated political writer, born in 1611; died in 1677. Having studied under Chillingworth at Oxford, and traveled on the continent, he was, on the outbreak of the Civil war, desirous of procuring a reconciliation between the king and Parliament, but his efforts were futile. During the Protectorate he wrote his *Oceana*, which describes an ideal republic, and which was published in 1656. In the reign of Charles II he was imprisoned on a charge of plotting against the government, but was released on account of the decay of his mental faculties. In addition to the *Oceana* he also published an English translation of four books of the *Æneid*.

Harrington, Mark Walrod, astronomer, born at Syracuse, Illinois, in 1848. He graduated at the University of Michigan in 1868, was professor of astronomy in that institution and director of its observatory 1879-91, and was chief of the Weather Bureau at Washington, 1891-95. He founded the *American Meteorological Journal* in 1884 and edited it until 1892. In 1895 he was appointed vice-president of the International Meteorological Conference at Munich.

Harris, Isham Green, legislator, born in Tullahoma, Tennessee, in 1818. He was a member of Congress in 1849-53, and governor of Ten-

nessee in 1857-63. During the latter part of the Civil war he served as a staff officer in the Confederate army. He subsequently practiced law in Memphis, and in 1877 was elected United States Senator, remaining in the Senate till his death in 1897. He was unanimously elected president pro tem. of the Senate in 1893.

Harris, Joel Chandler, story writer; born in Eatonton, Georgia, in 1848. He had a thorough familiarity with the negro of the post-bellum period, and while editing an Atlanta paper he produced for it the series of *Uncle Remus* sketches and songs which immediately made him known. Other works of negro lore in the same vein were *Nights With Uncle Remus*, *Mr. Rabbit at Home*, etc. As a journalist he was connected with the *Atlanta Constitutionalist*. He died in 1908.

Harris, Thomas Lake, religious reformer; born at Fenny Stratford, England, in 1823. He accompanied his father to the United States and became a Universalist pastor, and founded an 'Independent Christian Society,' when in 1850 he was drawn into the spiritualistic movement. He lectured in Great Britain in 1858, and on his return to the United States reorganized his society as the 'Brotherhood of the New Life.' At a later date he settled in California and established his society there.

Harris, William Torrey, educator, born at North Killingly, Connecticut, in 1835; died in 1909. He studied at Yale, and was superintendent of the St. Louis public schools 1868-80. In 1867 he became editor of the *Journal of Speculative Philosophy*. In 1889 he was appointed United States Commissioner of Education. He published many articles on philosophy, art, and education, and was a member of the Concord Summer School of Philosophy, and an officer of the French Academy.

Harrisburg (har'is-burg), a city, capital of Pennsylvania and of Dauphin County, on the Susquehanna River, 105 miles W. of Philadelphia. Several bridges here cross the river, which is a mile wide and flows through picturesque scenery. The city has handsome buildings and public monuments, including the war monument, 110 feet high. The capitol building was burned in 1897, and has been replaced by a new capitol, one of the handsomest in the United States, and remarkable for its artistic decorations. The state library has about 150,000 volumes. There are important industries, chiefly connected with iron and steel. Pop. 64,186.

Harrisburg, a city, capital of Saline County, Illinois, 68 miles N. E. of Cairo. It has flour, saw, and planing mills, brick and tile works. Coal is mined extensively. Pop. 5309.

Harrison (har'ris-un), Benjamin, United States President, grandson of President William Henry Harrison, was born at North Bend, Ohio, in 1833. He studied law and practiced in Indianapolis, his future home. He entered the Union army in 1862 as colonel, and served through the war, receiving the brevet rank of brigadier-general. In 1876 he ran for governor of Indiana, but was defeated, and in 1880 was a candidate for the United States Senate and was elected. In 1888 he was nominated by the Republican party for President, and was elected by a majority of 65 electoral votes. He ran again in 1892, but was defeated. He died in 1901.

Harrison, Frederick, author, born at London, England, in 1831. He graduated at Oxford in 1853, and came to the bar in 1858. In 1877 he was made professor of jurisprudence and international law under the Council of Legal Education. He gave much time and labor to the cause of education for working men and women. He published *Order and Progress*, *Social Statics*, *Annals of an Old Manor House*, *Early Victorian Literature*, *William the Silent*, etc.

Harrison, John, an English mechanician, born in Yorkshire in 1693 and died in 1776, was the son of a carpenter, and became an assistant to his father, who was occasionally employed in repairing clocks. An act of Parliament had been passed in 1714 offering rewards of £10,000, £15,000, or £20,000 for a method of ascertaining longitude within 60, 40, or 30 miles. This Harrison set himself to accomplish, but it was not till 1765 that he was fully successful, the highest award being then allotted him for the invention of his chronometer.

Harrison, Thomas Alexander, painter, was born at Philadelphia, Pennsylvania, in 1853. He became an artist, and produced many attractive landscapes, receiving for his *Le Crépuscule*, now in the Museum of Fine Arts, St. Louis, a prize of $2500. Other paintings are *In Arcady*, *Castles in Spain*, etc.

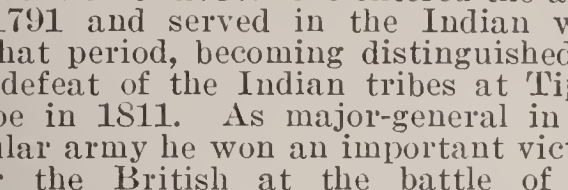
Harrison, William Henry, soldier and President, was born in Charles City County, Virginia, in 1773, the son of Benjamin Harrison, one of the signers of the Declaration of Independence and a member of the Constitutional

Convention of 1787. He entered the army in 1791 and served in the Indian wars of that period, becoming distinguished by his defeat of the Indian tribes at Tippecanoe in 1811. As major-general in the regular army he won an important victory over the British at the battle of the Thames in 1813. He was elected to Congress in 1817 and to the Senate in 1824, was minister to Colombia in 1828, and in 1836 was the Whig candidate for President of the United States, but was defeated by Van Buren. He was nominated again in 1840 and on this occasion was elected by a very large majority. He did not live long to enjoy the honor, dying on April 4, 1841, just one month after his inauguration.

Harrison, a city of Hudson County, New Jersey, on the Passaic River, opposite Newark. It has numerous manufactures, and contains the State Soldiers' Home. Pop. 14,498.

Harrogate (har'ō-gāt), a town of England, county of York (West Riding), noted for its magnesia, sulphur, and chalybeate springs. The waters are especially recommended for patients with deranged digestive organs, chronic gout, and some cutaneous diseases. The sulphurous springs possess laxative and diuretic properties. The chalybeate are tonic. The bathing season lasts from May to September, and the number of annual visitors is about 40,000. Pop (1911) 33,706.

Harrow (har'rō), an agricultural implement, employed for smoothing land which has been plowed. It consists of a frame of woodwork, or of iron, in which are fixed rows of iron teeth.



Set of Iron Harrows.

There are several varieties of this implement, such as the 'brake' for breaking down rough land; the 'drill harrow' for pulverizing land before the deposition of seed, the 'grubber' for pulverizing between furrows of green crops.

Harrow-on-the-Hill (or simply HARROW), a town of England, county of Middlesex, on a hill of peculiar form. The grammar-school of Harrow, the rival of Eton, was founded in 1571 for the education of the poor children of the parish, certain fees being charged for strangers; but it is now almost entirely a school for the wealthy. The education originally given was exclusively classical, but mathematics, science, English history and literature, music, and drawing are now included among the subjects taught. Pop. (1911) 17,076.

Harry the Minstrel (or HENRY) commonly called *Blind Harry*, a wandering Scottish poet of the fifteenth century, to whom is attributed a poetical narrative of the achievements of Sir William Wallace. Its date may probably be placed between 1470 and 1480. It professes to be based on a history written in Latin by John Blair and Thomas Gray, which is now lost. It is often inaccurate, and has ceased to be much read.

Hart, JAMES MCDOUGAL, painter, born at Kilmarnock, Scotland, in 1828. He was brought to the United States in childhood, studied art, and settled in New York in 1856, where he made a specialty of castles and quiet landscapes. Among his masterpieces are *Woods in Autumn* and *Moonrise in the Adirondacks*. He died in 1901. William, his brother, also a landscape painter, produced among his best works, *Peace and Plenty*, a harvest scene, and *October's Golden Hours*.

Hart, SOLOMON, an eminent historical painter, born at Plymouth, England, in 1806; died in 1881. He was elected Royal Academician in 1840. His works include *The Elevation of the Law* (in the Jewish worship), *Milton Visiting Galileo in Prison*, *Richard and Saladin*, etc.

Hart, a stag of five years of age. See *Stag*.

Harte, FRANCIS BRET, novelist and poet, was born at Albany, New York, in 1837. He went to California in 1854, and figured as a coal-dealer, a teacher, and a typesetter on the *Golden Era*, in which appeared some of his earliest literary efforts. He next became editor of the *Californian*, and in 1864 secretary to the United States Mint at San Francisco. In 1868 he became editor of the *Overland Monthly*, in which appeared, in 1869, the humorous poem of *The Heathen Chinee*. In 1878 he was appointed consul at Crefeld, whence he was transferred to Glasgow in 1880, and remained there until 1885. Among his best-known works are *The Luck of Roaring Camp; The Outcasts of Poker Flat; The Argonauts of '49; Two Men of Sandy Bar; Gabriel Conroy; Mrs. Skagg's Husbands; East and West Poems; In the Carquinez Woods; Maruja, a Novel*, etc. He died in 1902.

Hartford Convention, a convocation composed of representatives from the New England States, met at Hartford, Connecticut, in 1814, 'to confer on the subject of their public grievances.' The war of 1812 had been destructive to industry and wealth. The convention aroused suspicion and drew on its members bitter but unjust denunciation.

Hartford (hårt'fẽrd), a city, the capital of Connecticut, on the Connecticut River, 60 miles above its mouth. It is pleasantly situated, is built with great regularity, and has among its edifices the state-house (built at a cost of $3,100,000), city hall, deaf and dumb and lunatic asylums, Trinity College (Episcopal), Roman Catholic Cathedral, Wadsworth Athenæum, etc. Both manufactures and trade are of large extent, the former embracing carpets, linen, silk, edge-tools, etc., and it is the seat of the Colt Firearms Co. It is a great center of the insurance business. The American asylum for the education and instruction of the deaf and dumb at Hartford was started in 1817. Hartford was settled in 1635 by an English colony from Massachusetts. Pop. 98,915.

Hartford, a city, capital of Blackford County, Indiana, 45 miles S. by W. of Fort Wayne. It has large glassworks, pulp mills, etc. Pop. 6187.

Hartington (hår'ting-tun), SPENCER COMPTON CAVENDISH, MARQUIS OF, was born in 1833, son of the seventh duke of Devonshire. He was educated at Trinity College, Cambridge, and was attached, in 1856, to Earl Granville's Russian mission, and in 1857 was elected one of the members for North Lancashire. In 1863 he became a lord of the admiralty, and was war secretary from 1863 to 1866. In 1868 he became postmaster-general under Mr. Gladstone. In 1871 he was appointed chief secretary for Ireland. He went out with the Gladstone ministry in 1874, and soon after he became the leader of the Liberal party. On the fall of the Conservative government in 1880 he became secretary for India under Mr. Gladstone, and was transferred to the war office in 1882. In the general election of 1885 he was returned for the Rossendale division of Lancashire. He strenuously opposed Mr. Gladstone's Home Rule Scheme of 1886. He succeeded to the title of Duke of Devonshire on the death of his father in 1891, became lord president of the council in 1895, and died in 1908.

Hartlepool (här'tl-pöl), a borough of England, including the municipal borough of Hartlepool and the town of West Hartlepool, in the county of Durham, 17 miles S. E. of the city of that name. The trade and industries of the towns are much of the same character; they possess ironworks, puddling furnaces, brass-foundries, engine and boiler works, shipyards, sawmills, breweries, etc. Extensive fisheries are also carried on. The two towns may be said to form one port. There are spacious docks and a fine pier, serving as a breakwater. Pop. of Hartlepool 20,618, of West Hartlepool 63,932.

Hartley (hårt'li), DAVID, an English physician, principally celebrated as a writer on metaphysics and morals, born in 1705; died in 1757. He became a fellow of Jesus College, Cambridge, and finally practiced medicine at Newark, Bury St. Edmund's, and in London, and ended his days at Bath. In his *Observations on Man* (1749, two vols.) he formulates his hypothesis of nervous vibration and of the association of ideas.

Hartmann von der Aue (hårt'man), a German poet, born about 1170; died about 1220. He wrote poetical tales, among which are *Erec*, *Iwein*, both belonging to the Arthurian cycle of legends, and *Der Arme Heinrich*, founded on by Longfellow in his *Golden Legend*.

Hartranft, JOHN FREDERICK, soldier, born at New Hanover, Pennsylvania, in 1830; died in 1889. He studied law, entered the army in the Civil war and served till its close, gaining the rank of brevet major-general. He was chosen to execute the sentences of the military commission which tried Mrs. Surratt and others for the murder of President Lincoln. He was governor of Pennsylvania, 1872-78.

Hartshorn (hårtz'hōrn), in pharmacy, the horn of the common stag, from which substances deemed of high medical value were formerly prepared by distillation, such as spirits of hartshorn, oil of hartshorn, and salt of hartshorn. The active ingredient of these was ammonia, which is now obtained from gas-liquor and other sources.

Hart's-tongue (*Scolopendrium*), a genus of highly ornamental ferns. Their fronds are simple and undivided. There are about a dozen species known, the *S. vulgāre* being found in England and the United States.

Hartz. See *Harz*.

Harun al Rashid (hå-rön' ål rashēd'), a celebrated caliph of the Saracens, 786-809.

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HARVARD UNIVERSITY—THE CAMPUS

(See *Caliph.*) The popular fame of this caliph is evinced by the *Arabian Nights' Entertainments*, in which Harun, his wife Zobeide, his vizier Giaffer, and his chief eunuch Mesrur are conspicuous characters.

Haruspices (har-us'pi-sēs). See *Aruspices.*

Harvard University (hȧr'vard), the oldest university in the United States, situated in Cambridge, Massachusetts. The nucleus of it was formed in 1636 by the voting of a sum of £400 by the general court of Massachusetts. In 1638 the Rev. John Harvard bequeathed half of his property and his entire library to the projected institution. The college was immediately opened and received the name of its benefactor. The first graduation occurred in 1642. Its endowments have greatly increased since that time, and its invested funds now amount to about $24,000,000. The principal college buildings number twenty-five, and include several halls, such as University Hall, Harvard Hall, etc. The general library contains upwards of 850,000 volumes. There are more than 600 instructors, exclusive of assistants, and the number of students is about 4000. An entrance examination is required in one of two sets of subjects, of which classics predominate in the one, mathematics and science in the other. After the first year's course, which embraces a prescribed series of studies, the student has a large number of different courses to select from in order to qualify for the degree of Bachelor of Arts. The course of study extends to four years. Among the departments connected with the university are: 1. The Law School; 2. The Lawrence Scientific School; 3. The Divinity School; 4. The Medical, and 5. The Dental School, both situated in Boston; 6. The Bussey Institution of Agriculture; 7. The School of Mining. There may also be mentioned the Museum of Comparative Zoology (the Agassiz Museum), the Botanical Garden, and the Peabody Museum of American Archæology and Ethnology; also the Radcliffe College for women, established in 1894, in which women students can attain the full collegiate degrees.

Harvest-bug (*Leptus autumnālis*), a small larval insect of the family Acaridæ or mites. It is of a bright red color, so small as scarcely to be visible, and resembles a grain of cayenne pepper. It appears in June or July, and attacks the skin of domestic animals, as horses, dogs, sheep, etc., under which it burrows, causing a red pustule to arise. Its attacks are also very annoying to human beings, of whom it attacks the legs, thighs, and lower part of the abdomen.

Harvest-fly, a name given in the United States to a species of cicada, which appears as a winged insect in the harvest season.

Harvest-moon, a name which denotes a peculiarity in the apparent motion of the full moon, by which in the United States and high latitudes generally it rises about the same time in the harvest season (or about the autumnal equinox in September) for several successive evenings. In southern latitudes this phenomenon occurs in March. It is owing to the fact that the moon is then traveling in that part of her orbit at which it makes the least possible angle with the ecliptic.

Harvest-mouse (*Musmessorius*), the smallest British quadruped, first made known to science by White of Selborne. It builds a globular nest usually suspended among stalks of wheat, etc.

Harvest-spider (*Phalangium longipes*), the Shepherd-spider abounding in autumn, possessing legs of unusual length. When irritated it has the peculiar property of throwing off one or more of its legs.

Harvey (hȧr'vi), Sir George, an eminent Scotch painter, born in 1806; died in 1876. He was a native of St. Ninians, near Stirling, and in his eighteenth year entered the Trustees' Academy, Edinburgh. In 1826 he became an associate of the Royal Scottish Academy, and in 1829 an academician. He was highly successful in depicting scenes connected with the religious history of Scotland, such as *The Covenanters Preaching, The Battle of Drumclog, Quitting the Manse*, etc. He also excelled in depicting mountain scenery. In 1864 he was elected president of the Royal Scottish Academy, and was knighted in 1867.

Harvey, William, an English physician, the discoverer of the true theory of the circulation of the blood, was born at Folkestone in 1578; died in 1657. He entered Caius College, Cambridge, in 1593, and about 1599 proceeded to Padua, then the most celebrated school of medicine in Europe, and attended lectures on anatomy, surgery, and other branches of medical science. He took the degree of M. D., and returned to England in 1602. He settled in London, was admitted fellow of the College of Physicians, elected physician of St. Bartholomew's Hospital, and in 1615 was chosen Lumleian lecturer. His views on

the circulation of the blood were formally given to the world in his *Exercitatio Anatomica de Motu Cordis et Sanguinis in Animalibus* ('On the Movement of the Heart and Blood in Animals'), published at Amsterdam in 1628, in which he claims to have expounded and demonstrated them for upwards of nine years. Harvey's theory was attacked by several foreign physicians; but from the commencement his views were widely received. In 1623

William Harvey.

he was appointed physician extraordinary to James I, and in 1632 he became physician in ordinary to Charles I. He was present at the battle of Edgehill, and afterwards accompanied Charles to Oxford. Here he received the degree of M. D., and was elected Master of Merton College, an office which he lost on the surrender of Oxford to the Parliament. He returned to London in 1646, and spent the remainder of his life in retirement. Of Harvey's works, the next in importance to the *De Motu* is *Exercitationes de Generatione Animalium.*

Harvey, a city of Cook County, Illinois, a suburb of Chicago. It has manufactures of machinery, stores, railroad supplies, etc. Pop. 7227.

Harwich (hăr'ich), a seaport of England, County Essex, 66 m. E. N. E. of London. The harbor is spacious, and has been much improved by the construction of two breakwaters. Steam packets ply regularly to continental ports. Ship-building and other maritime employments are carried on, and cement is dredged up outside the harbor. Harwich is much frequented by sea-bathers. Pop. (1911) 13,623.

Harz, or HARTZ (hărts), the *Hercynia Silva* of the Romans, the most northerly mountain chain of Germany, from which an extensive plain stretches to the North Sea and the Baltic. It extends from southeast to northwest, and comprises an extent of about 60 miles in length and nearly 20 in breadth, embracing the towns of Klausthal, Goslar, Blankenburg, Wernigerode, etc. The Brocken, its highest summit, is 3742 feet high. (See *Brocken.*) That part of the Harz which includes the Brocken, with the neighboring high summits, is called the Upper Harz, and consists entirely of granite. The southeast portion is called the Lower Harz. The Harz abounds in woods and fine pastures; and is rich in minerals, including silver, iron, lead, copper, zinc, arsenic, manganese, granite, porphyry, slate, marble, alabaster, etc.

Hasdrubal (has'dru-bal; more correctly *Asdrubal*, 'Baal is his help'), the name of several Carthaginian leaders, particularly the brother of Hannibal, the hero of the Second Punic war. On the departure of Hannibal for Italy, B.C. 218, he was left in command of the army in Spain, in which capacity he carried on a long series of military operations against the Roman troops, which were commanded by Cnæus and Publius Scipio. His brother Hannibal requiring his assistance in Italy, Hasdrubal led an army from Spain into that country (B.C. 207), but before he could join forces with his brother he was defeated on the right bank of the Metaurus by C. Nero and M. Livius. Nero is said to have thrown Hasdrubal's head into Hannibal's camp, as a brutal announcement to him of the defeat and death of his brother.

Hashish (hash'ēsh), an intoxicating preparation made in Eastern countries from common hemp (*Cannăbis satīva*), or rather from the Indian variety of it (*Cannabis Indica*); also a name for this plant itself or for its tender shoots. The juice of the plant has powerful narcotic properties, and is variously made use of. A resin which the plant gives out is often gathered and kneaded and formed into small balls called *ehurrus*, and from this a narcotic is prepared. It has the appearance of a tenacious ointment of a greenish-yellow color, with an acrid savor and a nauseous smell. Hashish produces a kind of intoxication, accompanied with ecstasies and hallucinations. When dried and smoked as tobacco the plant is called *bhang;* or this name is given to a drink prepared from the leaves and shoots. *Ganja* or *Gunja* is the dried shoots of the female plant with the resin on them. Hashish in several forms is employed in medicine.

Haslar Hospital. See *Gosport.*

Haslingden (has'ling-den), a town of England, county of Lancaster, 16 miles north of Manchester, with manufactures of cottons, woolens, etc. Pop. (1911) 18,723.

Hasselt (häs'selt), a town of Belgium, capital of the province of Limburg. It has tobacco factories and gin distilleries. Pop. 16,179.

Hastings (hās'tingz), a city of Nebraska, capital of Adams County, 97 miles s. w. of Lincoln. It has lumber, harness, cigars, and other manufactures and ships livestock and grain. Here is the State Asylum for the Chronic Insane. Pop. 9338.

Hastings (hās'tingz), a town of England, county of Sussex, one of the Cinque Ports, pleasantly situated on the seacoast, and including the suburb of St. Leonards-on-Sea. In front of the town is an esplanade, a fine pier 900 feet long, and baths said to contain the largest tepid swimming-bath in the world. There is no harbor. Fishing and boat-building are carried on, but the principal support of the town is derived from the numerous visitors who frequent it during the bathing and winter seasons. There are here the ruins of an ancient castle, and of the church and conventual buildings of a college, supposed to have been founded in the reign of Henry I. William of Normandy defeated Harold near here, 14th October, 1066. Pop. (1911) 61,014.

Hastings, Francis Rawdon, Marquis of, Governor-general of India, born in 1754; died in 1825. He entered the army and from 1776 to 1782 served with distinction in the American war. In 1793 he became Earl of Moira, and in 1795 commanded the expedition to Quiberon. From 1813 to 1823 he was governor-general of India, and was successful in the Nepaulese and Mahratta wars. In his later years he was governor of Malta.

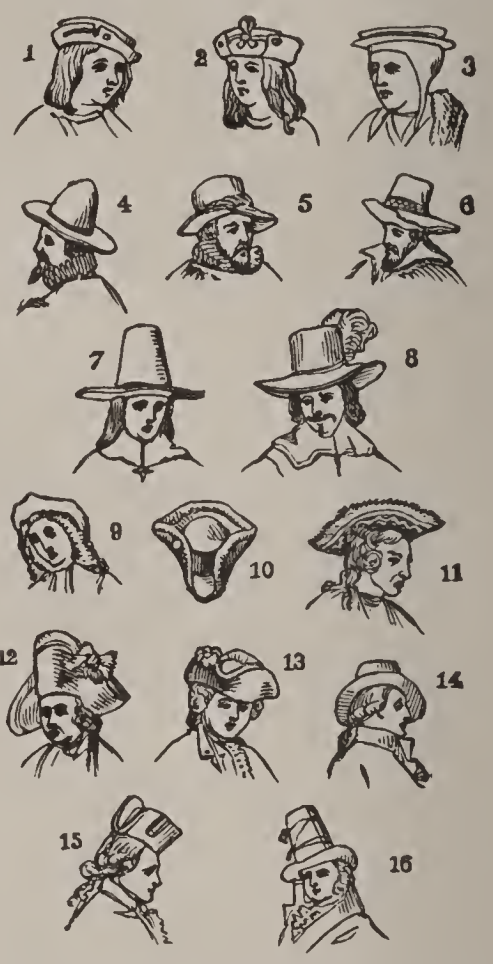
Hastings, Warren, first governor-general of India, was born at Daylesford, in Worcestershire, in 1723; and died there in 1818. He was grandson of the rector of Daylesford. He was educated at Westminster School, and in 1750 he set out for Bengal in the capacity of a writer in the service of the East India Company. When stationed at Cossimbazar he was taken prisoner by Surajah Dowlah on the capture of the place (1756). Having made his escape, he served as a volunteer under Clive in 1757. He was representative of the Company at Moorshedabad from 1758 to 1761. In the latter year he removed to Calcutta, having obtained a seat in the Bengal Council, but returned to England in 1764. As he lost the bulk of his means by unfortunate Indian investments, he again entered the Company's service, and sailed for India in 1769. In consequence

Warren Hastings.

of the misgovernment of the Nabob of Bengal the Company had deprived him of all real power, and now wished to have the country more directly under their control. Warren Hastings was its chief instrument in this undertaking, and in 1772 became president of the Supreme Council of Calcutta. Mohammed Reza Khan, the administrator of the revenues of Bengal, was now accused by an unprincipled character named Nuncomar of corruption and abuses of power. In this prosecution Hastings acted as the tool of the Company. Mohammed and Shitab Roy, dewan of Behar (who had been similarly accused), were afterwards honorably acquitted, but meantime the reorganization desired by the Company had been carried out. In 1773 the Company's powers were considerably modified by an act of Parliament, and Hastings now received the title of Governor-general of India. As the majority of the Council disapproved of Hastings' past policy, Nuncomar, his old ally, took advantage of the circumstance to accuse him of peculation (1776). The accusations were favorably received by the Council, when Nuncomar was suddenly accused by a Calcutta merchant (acting probably on the instigation of Hastings) of forgery, tried, and executed. In 1776 the directors of the Company petitioned the government for his removal from the Council,

but Hastings resigned, and a successor to him was appointed. In 1777 one of the members of the Council died, and Hastings, having thus procured a casting vote, withdrew his resignation, and returned to office. He now displayed extraordinary resource in meeting dangerous movements on the part of the Mahrattas, the Nizam of the Deccan, and Hyder Ali of Mysore, and to procure the needful money was less than scrupulous in his treatment of the rulers of Benares and Oude. He thus gave good grounds for censure, and a motion for his recall was passed in the House of Commons. Fox's India Bill was thrown out in 1783, but next year Pitt's bill, establishing the board of control, passed, and Hastings resigned. He left India in 1785, and was impeached by Burke in 1786, being charged with acts of injustice and oppression, with maladministration, receiving of bribes, etc. This celebrated trial, in which Burke, Fox, and Sheridan thundered against him, began in 1788, and terminated in 1795 with his acquittal, but cost him his fortune. The Company in 1796 settled on him an annuity of £4000 a year, and lent him £50,000 for eighteen years free of interest. He passed the remainder of his life in retirement at Daylesford, which he purchased.

Hat, an outdoor covering for the head, of various shapes and materials (as felt, silk, wool, straw), but having a *brim* as its most distinctive and general feature. Hats are of ancient origin. Among the Greeks, for instance, the *petasos* was worn, which had a brim, and was similar to the round felt now worn. The shape of the hat has varied extremely in Europe at different periods. The *dress hat* or *silk hat* with a smooth nap outside is an important form of this article, though felt hats are in more general wear. (See *Felt.*) The silk hat was invented at Florence about 1760. The manufacture, however, did not make much progress till 1828. Up to and even after this time beaver fur was the chief material for hats. A silk hat is composed of a skeleton, to which the silk plush is glued. The skeleton, consisting of three parts, the cylindrical part or body, the crown, and the brim, is usually made of linen, covered with gum-lac, and to the cylindrical part the crown is gummed. The cylindrical part is made by gumming together the edges of a piece of cloth shaped on a cylinder. The brim is composed of superposed layers of stiffer cloth, and made with a flat projecting surface round its inner edge, which is gummed to the skeleton. For covering the hat a sort of hood of silk plush is made, cut across in an oblique line. This cover is drawn over the skeleton on the block, and fitted exactly to it by the application of a hot iron. The heat of the iron melts the gum-lac, which on cooling cements the covering to the skeleton. The edges



Forms of Hats in 16th, 17th, and 18th Centuries.

1, 2, time of Henry VIII. 3, time of Mary. 4, time of Elizabeth. 5, 6, time of James and Charles I. 7, 8, time of Commonwealth. 9, 10, time of William III. 11-16, Eighteenth Century.

of the oblique cut are also coated with gum-lac. The hat is finally shaped on the block or form, and the plush damped and polished, while the hat revolves on a turning lathe. In the manufacture of straw hats the straw commonly used is that of wheat or barley. The best comes from Italy, and particularly from Tuscany, but straw hats are also largely made in England. Palm-leaf hats are imported from China and Manila, and are also machine-made in the United States.

Hatching, natural and artificial. See *Incubation.*

Hatchment (hatch'ment; corrupted from *achievement*), in heraldry, the coat of arms of a person dead, usually placed on the front of a house, in a church, or on a hearse at funerals, by which the fact of the death and the rank of the deceased may be

known; the whole being distinguished in such a manner as to indicate whether the person was a bachelor, a married man, a wife, etc.

Hatchway (hatch'wā), a square or oblong opening in the deck of a ship, affording a passage from one deck to another, or into the hold. The *after-hatchway* is placed near the stern, the *fore-hatchway* towards the bows, and the *main-hatchway* is placed near the mainmast.

Hatfield (hat'fēld), a town of England, in the county of Hertford. Near it is Hatfield House, built by Sir Robert Cecil, the residence of the Marquis of Salisbury. Pop. 4754.

Hathor. See *Athor.*

Hatras (hä'trus), a town of India, Northwest Provinces, Aligarh District, formerly one of the strongest fortresses in India, now a commercial center. Pop. 42,578.

Hatteras, Cape. See *Cape Hatteras.*

Hattiesburg, a city, capital of Forrest County, Mississippi, 70 miles N. by W. of Gulfport. It has ironworks, carshops, lumber mills, etc. Pop. 11,733.

Hatto (hat'to), the name of two archbishops of Mainz, of which the second, who died in 969 or 970, is the best known. He was Abbot of Fulda until 968, when he was appointed Archbishop of Mainz. Of his subsequent life very opposite accounts exist: some represent him as an upright prelate and reformer of abuses; others in the blackest colors. The legend of his being devoured by rats, and which Southey has popularized, is well known.

Hatton (hat'on), Sir Christopher, Lord-chancellor of England, a favorite of Queen Elizabeth, born about 1540; died in 1591. He was introduced at court in 1564. He was elected a member of Parliament in 1571, became captain of the queen's guard in 1572, vice-chamberlain and a privy-councillor in 1577, lord-chancellor in 1587. He was one of the commissioners for the trial of Mary, queen of Scots, in 1586.

Hatzfeld (hâts'felt), a town of the Austrian Empire, in Hungary, district of Torontal. Pop. 10,152.

Hauberk (hạ'bėrk), a kind of coat of mail, comprising the small and the large hauberk, the former consisting of a jacket in scales descending to the hips, with loose sleeves not reaching to the elbow; the latter with a *camail* or hood, reached to the knee, the sleeves extending a little below the elbow.

Hauff (houf), Wilhelm, a German novelist and writer of humorous and fantastic stories, born 1802; died 1827. His first publication was his *Almanach of Tales* for the year 1826, which was followed by similar collections for the next two years, the whole forming a collection that has been highly popular. Extracts from the *Memoirs of Satan* appeared in 1827, but remained uncompleted. *Liehtenstein*, a novel written under the inspiration of Sir Walter Scott, appeared in 1826, and is one of the best German novels of its class. In 1827 was issued *The Man in the Moon*, and the same year *Fantasies in the Wine Cellar of Bremen Council*, a piece of excellent humor. Among the best of his works are two novelettes, *The Pieture of the Emperor* and *Thc Beggar-woman of the Pont-des-Arts.*

Haupt (houpt), Lewis Muhlenberg, engineer, was born at Gettysburg, Pennsylvania, in 1844. He graduated at West Point, entered the engineer corps of the army, but resigned in 1869 and became professor of civil engineering in the University of Pennsylvania. After 1892 he engaged in the practice of his profession, served in the Nicaragua and Panama Canal Commissions, was chief engineer of the survey for a ship canal across New Jersey, and served in other enterprises. He wrote *Working Drawings, The Topographer, A Move for Better Roads*, etc.

Haupt, Paul, orientalist, was born at Görlitz, Germany, in 1858. In 1883 he became professor of Semitic languages in Johns Hopkins University. He is the author of many works, including *The Cuneiform Aeeount of the Deluge, The Akkadean Language, Jonah's Whale, The Book of Esther*, etc., and editor of *The Polyehrome Bible*, and *New Critical Edition of Hebrew Text of the Old Testament.*

Hauran (hä-ö-rän'), a district in Syria, east of the Jordan and south of Damascus. It contains the ruins of many ancient towns, with numerous Greek inscriptions. In the Roman period it was one of the four provinces of Bashan. It is a very fertile territory, but thinly populated at the present time.

Haussa (hous'sa). See *Houssa.*

Haustellata (hạs-tel-la'ta), a very extensive division of insects, in which the mouth is furnished with a haustellum or proboscis adapted for suction. It includes the butterflies and moths, two-winged flies, etc., these insects being contrasted with the Mandi-

bulata, which have jaws acting as cutting organs.

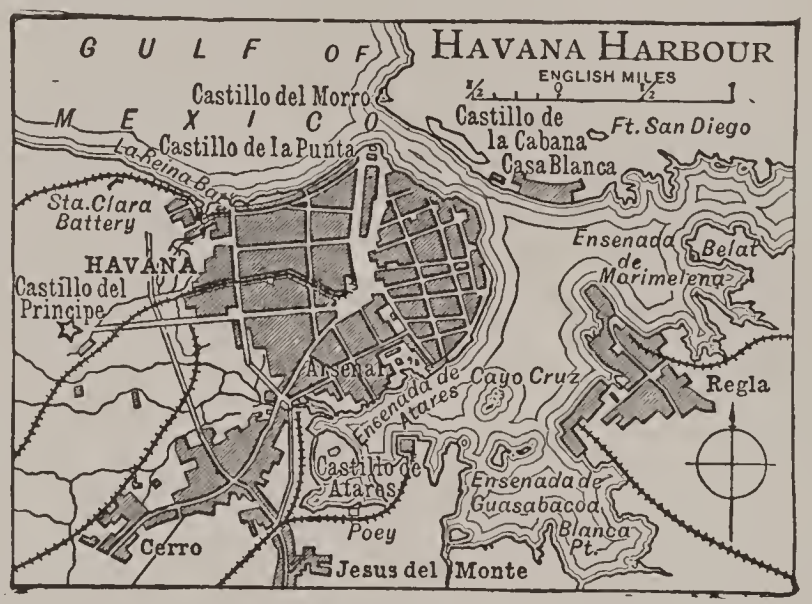
Hautboy (ō'boi). See *Oboe.*

Hautelisse Tapestry (ōt'lis), a kind of tapestry wrought with a perpendicular warp, as distinguished from *Basselisse.*

Hautes-Alpes. See *Alpes.*

Hautes-Pyrénées. See *Pyrénées.*

Haüy (å-ü-ē), René Just, a French mineralogist, born in 1743; died in 1822. He studied theology, became an abbé, and during twenty-one years occupied the place of a professor, at first in the college of Navarre, and afterwards in that of the Cardinal Le Moine. He studied botany, and subsequently mineralogy, and introduced a once celebrated system of crystallography. On the outbreak of the revolution Haüy was imprisoned for refusing to subscribe to the new constitution, but his life was saved by the exertions of Geoffroi de St. Hilaire. In 1793 he was appointed a member of the Commission of Measures and Weights, in 1794 conservator of the Cabinet des Mines, and in 1795 teacher of physics in the Ecole Normale. In 1802 Napoleon made him professor of mineralogy in the Musée d'Histoire Naturelle, and also shortly after in the Faculté des Sciences. Haüy was remarkable for the extreme modesty of his disposition. His principal writings are his *Essai sur la Théorie et la Structure des Cristaux* (1784), his *Traité de Minéralogie* (1802), his *Traité élémentaire de Physique* (1803), and his *Traité de Cristallographie* (second edition, 1822), etc.—His brother Valentin, born 1745, died 1822, started the first institution for the instruction of the blind. See *Blind (The).*



Havana (ha-van'a; Spanish, *La Habana*, 'the haven'), an important maritime city, capital of Cuba, on the northwest side of the island, with an extensive and excellent natural harbor. The town in the older parts has narrow, badly-paved streets, but there are also wide and handsome promenades and avenues. The houses, which are low and with flat roofs, resemble those of Southern Spain. Havana is the see of a bishop, and was the seat of the governor. The cathedral formerly contained the ashes of Columbus, which were brought hither from San Domingo in 1796. Among the other buildings are the governor's house, the admiralty, the university, the exchange, the opera house, etc. The staple manufacture is that of its celebrated cigars. The other manufactures, consisting chiefly of chocolate, straw hats, and woolen fabrics, are not of much consequence. The trade is extensive, the most important articles of export being sugar and tobacco, unmanufactured or in the form of cigars and cigarettes; other exports are molasses, coffee, wax, honey, rum. The United States have the principal share of the trade, and Spain and England rank next. The town was founded in 1511, but was only fairly begun in 1519. In 1762 it was taken by the British, who restored it to Spain in the following year. It was blockaded by the American fleet during the war with Spain. January 1, 1899, the United States military authorities took formal possession of the city, and relinquished it in 1902. Pop., 1907, 297,159.

Havel (hä'vel), a navigable river of Germany, which rises in Mecklenburg-Schwerin, enters Prussia, flows past Spandau, where it receives the Spree, and joins the Elbe, after a course of 160 miles.

Havelberg (hä'vel-burg), a town in Prussia, province of Brandenburg, on the Havel, engaged in brewing, sugar-refining, and shipbuilding. Pop. 6649.

Havelock (hav'lok), Sir Henry, major-general in the British army, was born at Bishop-Wearmouth, near Sunderland, in 1795. Having entered the army, he served with distinction in the Burmese war (1824-26). In 1829 he married a daughter of Marshman, the celebrated missionary, became a Baptist, and

was distinguished during the remainder of his life by his earnest religious zeal. He attained his captaincy in 1838, participated in the Afghan war, was present at the storming of Ghazni and the capture of Cabul, and in Sale's march to Jelalabad, and assisted in the defense of that city, and in the defeat of Mohammed

Sir Henry Havelock.

Akbar, 1843. He was made a Companion of the Bath, and brevet-major, took part in the Mahratta war, and distinguished himself in the Sikh war of 1845. In 1851 he was promoted to the adjutant-generalship of the queen's forces in India. On the outbreak of the Indian mutiny he was despatched to Allahabad to support Sir H. Lawrence at Lucknow and Sir H. Wheeler at Cawnpore. After several victories he arrived at Cawnpore and found that Nana Sahib had massacred the prisoners. Pursuing his march to Lucknow, he defeated the Rebels at Bithoor, and finally, with the aid of Outram, won the battle of Alumbagh. Having captured Lucknow, Havelock and Outram were shut up there until relieved by Sir Colin Campbell, 17th November, 1857. He died just seven days later. He was raised to the rank of major-general and made a baronet.

Haverford College an institution of learning, situated at Haverford, Pennsylvania, 9 miles W. N. W. of Philadelphia. It is under the control of the Society of Friends.

Haverfordwest (hav'ėr-fōrd, här'-fōrd), a town of Wales, county town of Pembroke, and one of the Pembroke district of parliamentary boroughs, on the West Cleddaw River. It manufactures paper, and has a small shipping trade. Pop. (1911) 5,920.

Haverhill (hā'vėr-il), a city of Essex County, Massachusetts, on the Merrimac, 33 miles N. of Boston. It has extensive manufactures of boots and shoes, employing nearly 10,000 hands, and also produces hats, caps, flannels, and bricks. The river is navigable to this town. The poet Whittier was born here in 1807. Pop. 44,115.

Haversack (hav'ėr-sak), a bag of strong cloth with a strap fitting over the shoulder, worn by soldiers in marching order, for carrying their provisions.

Haversian Canals (ha-ver'si-a n), a network of minute canals, which traverse the solid substance of bones, conveying the nutrient vessels.

Haverstraw (hav'er-strą), a village of Rockland County, New York, 35 miles N. of New York City. It has extensive manufactures of bricks and brick machines, and has dyeworks and print mills. Pop. 5669.

Havildar (häv-il-dar'), the highest non-commissioned officer in the native armies of India, in rank equivalent to a sergeant. Also a police official in villages.

Havre (ä-vr), LE (formerly *Le Havre-de-Grâce*), a seaport of Northern France, dep. Seine-Inférieure, on the north side of the estuary of the Seine, 108 miles northwest of Paris, built of brick or stone in straight, wide streets. The public buildings possess little interest. The manufactures include chemicals, machinery, cotton goods, earthen and stone ware, paper, glass, oil, refined sugar, ropes, etc. A government tobacco factory employs 300 workmen; and a great number of vessels are built. But the chief dependence of Havre is on its commerce, which is the greatest of any French port next to Marseilles. It has a large trade with England and Germany, and especially with America, importing great quantities of cotton and other produce; and exporting numerous articles of French manufacture. The importance of Havre dates from the early part of the sixteenth century. Pop. (1906) 132,430.

Hawaii (hä-wī'ē), or HAWAIIAN ISLANDS, formerly the SANDWICH ISLANDS, a cluster of islands in the North Pacific, thirteen in number, with a total area estimated at 6000 to 7000 square miles. Five of these islands are barren islets, and only four are of considerable size. They are generally of volcanic origin and mountainous in charac-

ter, with numerous lofty peaks. The highest of these, Mauna Kea, on the island of Hawaii, is 13,805 feet high, and Mauna Loa (an active volcano on the same island) is 13,675 feet. On the eastern slope of the latter is the famous volcano Kilauea, 4400 feet in elevation, but with an enormous crater and a living lake of fire, which at times overflows in tremendous eruptions. Haleakala on Maui Island, is 10,030 feet high and has a crater 2000 to 3000 feet deep and from 25 to 30 miles in diameter. It is, however, inactive. The surface of the islands in general is rugged, though with many fertile valleys; the coasts high and precipitous, with few good harbors. Of the habitable islands, Hawaii (which now gives its name to the group) is much the largest, its area being 4015 square miles. The second largest, Maui, of 728 square miles area, consists of two peninsulas, connected by a low isthmus. The most important island is Oahu, of only 600 square miles in area, yet the most populous and containing the city of Honolulu, the capital and chief port of the island group. Next in size is Kauai, of 544 square miles. The remaining habitable islands are much smaller, Molokai, of 261 square miles, being peopled by a colony of lepers, sent there from the other islands. The native Hawaiians are of the light-colored oceanic Malay stock, and have become civilized and converted to Christianity. There are extensive forests, and fruits grow profusely, including banana, mango, guava, plantain, and others. Coffee is a semi-wild plant, and taso yields an important food product. Of cultivated plants, the sugar cane is by far the most important, the great bulk of the population being engaged in its culture, and Hawaii ranking third in cane sugar production. Coffee and rice are also raised, the chief exports being sugar, rice, coffee, bananas, tallow, and hides. The natives of the islands have greatly decreased in numbers, being now much surpassed by the introduced population, consisting of Japanese, Chinese, Portuguese, and comparatively few other Europeans and Americans. Honolulu has grown into a city of considerable importance, having a splendid harbor, and concentrating nearly the whole trade of the islands.

These islands were discovered by Captain Cook in 1778, the discoverer losing his life here. Each island had formerly its own king, but under Kamehameha I (who died in 1819) they were combined into one kingdom. It was a simple despotism until 1840, when Kamehameha III granted a constitutional government. At a later date Queen Liluokalani sought to restore the despotism and in 1893 a revolution broke out, headed by American settlers, and the queen was deposed and a provisional government formed under the presidency of Sanford B. Dole. It was made a republic in the following year. The islands were offered to the United States, but not accepted until August, 1898, when the warship *Philadelphia* was sent to take possession. In June, 1900, the group was organized under a territorial government, and given the title of Hawaii Territory. Pop. 191,909.

Hawarden (hȧr'den), a town in Flintshire, Wales, lying in a coal district, and having valuable clay beds in the vicinity. In the neighborhood is Hawarden Castle, residence of the late William E. Gladstone. Pop. 20,575.

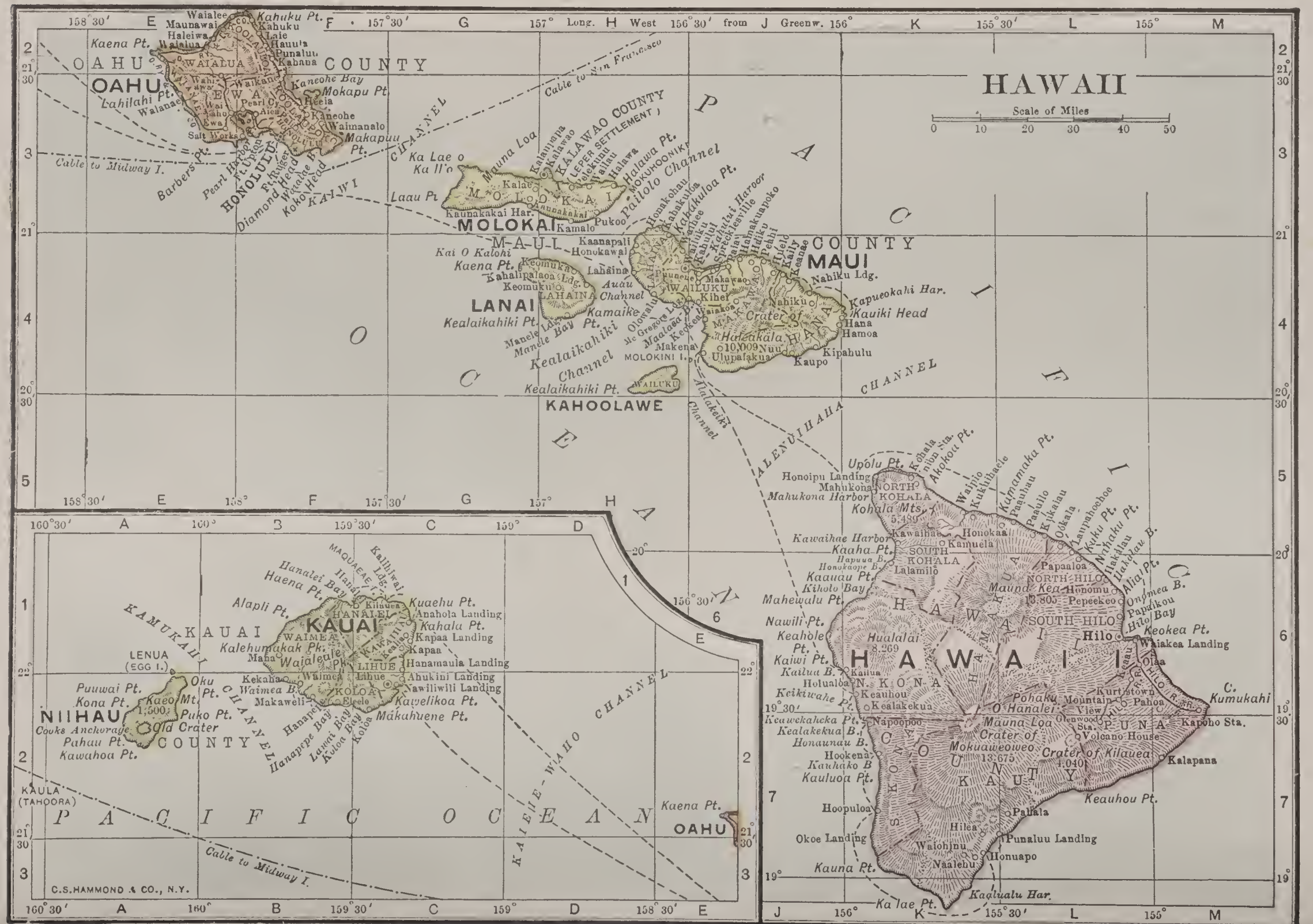
Hawes (hauz), STEPHEN, an English poet, who lived in the end of the fifteenth and beginning of the sixteenth century. The exact date of his birth and death is unknown. His principal work is *The Historie of Graunde Amour and la Bell Purcell, or The Pastime of Pleasure.*

Hawfinch (hȧ'finch; *Cocothraustes vulgāris*), a species of grossbeak, so called from the belief that it subsisted principally on the fruit of the hawthorn. It is one of the largest of the finches. It resembles the chaffinch in color, but is distinguished from it by its enormous beak, larger size, and bill-hook formation of some of its wing-feathers. Among American species of grossbeak are evening grossbeak and pine grossbeak.

Hawick (hȧ'ik), a parliamentary burgh of Scotland, in Roxburghshire, on the Teviot, 50 miles s. w. from Edinburgh. The staple industries of the town are the manufacture of hosiery and tweeds, but tanning, skin-dressing, oil-making, dyeing, and iron-founding are also carried on. Pop. 17,303.

Hawk (hȧk), a name often applied to all birds of prey except the eagles, vultures, and owls. It thus includes the falcons as well as the hawks proper, the latter being distinguished from the former chiefly by their shorter wings, which do not reach the extremity of the tail, and have the fourth quill longest and the first short; their beaks also are less robust, and want the tooth-like notch of the former. None is bolder and more pertinacious in pursuit of its prey than the sparrow-hawk (which see); see also *Falcon.*

Hawke (hȧk), EDWARD, LORD, a celebrated English naval commander, born in 1705; died in 1781. He entered the navy as a midshipman, in 1734 received the command of the *Wolf*, and


158° 30′ E 158° F 157° 30′ G 157° Long. H West 156° 30′ from J Greenw. 156° K 155° 30′ L 155° M
HAWAII
Scale of Miles
0 10 20 30 40 50
OAHU COUNTY
OAHU
WAIALUA
EWA
HONOLULU
Waialee
Maunawai
Haleiwa
Waialua
Kahuku Pt.
Kahuku
Laie
Hauula
Punaluu
Kahana
Kaena Pt.
Kaneohe Bay
Mokapu Pt.
Heeia
Kaneohe
Waimanalo
Makapuu Pt.
Lahilahi Pt.
Walanae
Waikane
Waiahole
Pearl City
Aiea
Salt Works
Ewa
Barbers Pt.
Pearl Harbor
Ft. Kamehameha
Ft. Ruger
Diamond Head
Waikiki
Koko Head
KAIWI CHANNEL
Cable to Midway I.
Cable to San Francisco
KALAWAO COUNTY
LEPER SETTLEMENT
Mauna Loa
Ka Lae o Ka Ilio
Kalaniana
Kalawao
Halawa Pt.
MOKUHOONIKI
Pailolo Channel
Laau Pt.
Kalae
MOLOKAI
Kaunakakai Har.
Kaunakakai
Pukoo
Kamalo
M-A-U-I
Kaanapali
Honokawai
Kai O Kalohi
Kaena Pt.
Keomuku
Kahalipalaoa Ldg.
Lahaina
Auau Channel
LANAI
Kealaikahiki Pt.
Manele Ldg.
Manele Bay
Pt.
Kealaikahiki Channel
KAHOOLAWE
MOLOKINI I.
Honokohau
Kahakuloa
Kahului
Wailuku
Kaahumanu
Spreckelsville
Paia
Haiku
Hamakuanoko
Hana
Pehhi
Huelo
Kaily
Keanae
COUNTY
MAUI
Nahiku Ldg.
Kapueokahi Har.
Kauiki Head
Hana
Hamoa
Kipahulu
Kaupo
WAILUKU
Makawao
Kihei
Nahiku
Waiakoa
Olowalu
Olowalu Ldg.
Mc Gregors Ldg.
Maalaea Bay
Pt.
Keokea
Crater of HALEAKALA
Haleakala
10,009
Nuu
Ulupalakua
CHANNEL
Alalakeiki Channel
ALENUIHAHA CHANNEL
Upolu Pt.
Kohala Sugar Plantation Sta.
Akoko Pt.
Honoipu Landing
Mahukona
Mahukona Harbor
NORTH KOHALA
Kohala Mts.
5,480
Waimea
Kumamaka Pt.
Paauhau
Paauilo
Ookala
Kaumahoehoe
Kukui Pt.
Nihaku Pt.
Hakalau
Hakipuu B.
Kawaihae Harbor
Kawaihae
Honokaa
Kamuela
Kaaha Pt.
Hapuua B.
Honokaope B.
SOUTH KOHALA
Lalamilo
Kaauau Pt.
Kiholo Bay
Mahewalu Pt.
Nawili Pt.
Keahole Pt.
Kaiwi Pt.
Kailua B.
Kailua
Holualoa
N. K O N A
Keauhou
Kealakekua
Keikiwahe Pt.
Keawekaheka Pt.
Kealakekua B.
Honaunau B.
Napoopoo
Hookena
Kauhako B
Kauluoa Pt.
Hoopuloa
Okoe Landing
Kauna Pt.
Ka lae Pt.
Alika Pt.
Onomea B.
Papaikou
Hilo Bay
Keokea Pt.
Waiakea Landing
Olaa
Hilo
Papaloa
NORTH HILO
Maund Kea
13,805
Honomu
Pepeekeo
SOUTH HILO
Hualalai
8,269
Kurtistown
Pahoa
C. Kumukahi
Pohaku O Hanalei
Mountain View
Kapoho Sta.
Mauna Loa
Crater of Mokuaweoweo
13,675
Olenwood Sta.
P U N A
Volcano House
Crater of Kilauea
4,040
Kalapana
Keauhou Pt.
Pahala
Hilea
Punaluu Landing
Waiohinu
Honuapo
Naalehu
Kaalualu Har.
KAU DESERT
KAU
HAWAII
KAMUKAUI CHANNEL
KAUAI COUNTY
KAUAI
LENUA (EGG I.)
NIIHAU
KAULA (TAHOORA)
Puuwai Pt.
Kona Pt.
Kaeo Mt. 1,500
Oku Pt.
Puko Pt.
Cooks Anchorage
Old Crater
Pahau Pt.
Kawahoa Pt.
Alapli Pt.
Huena Pt.
Hanalei Bay
Hanalei
MAQUAEAE I.
Kalihiwai Ldg.
WAIMEA
Kalehumakak Pk.
Waialeale
Mana
HANALEI
Kilauea
LIHUE
Waimea
Kekaha
Waimea B.
Makaweli
KOLOA
Eleele
Hanapepe
Hanapepe Bay
Lawai Bay
Koloa Bay
Kuaehu Pt.
Anahola Landing
Kahala Pt.
Knpaa Landing
Kapaa
Hanamaula Landing
Ahukini Landing
Nawiliwili Landing
Kawelikoa Pt.
Makahuene Pt.
KAIEIE-WAHO CHANNEL
Kaena Pt.
OAHU
Cable to Midway I.
C.S.HAMMOND & CO., N.Y.

in 1747 became commander of a squadron, and defeated the French fleet at Belleisle. Hawke was in consequence made a K. C. B., and vice-admiral of the blue. In 1759 he defeated the French at Quiberon. Hawke was, in 1765, appointed vice-admiral of Britain, and was elevated to the peerage in 1776.

Hawker (hąk'er), ROBERT STEPHEN, an English poet and divine, was born in 1805, and died in 1875. He was educated at Oxford and became vicar of Morwenstow, Cornwall. His works comprise *Eeelesia, Cornish Ballads; Eehoes from Old Cornwall; The Quest of the Sangreal*, etc.

Hawkers and Peddlers, traveling vendors of small wares.

Hawke's Bay, a district of New Zealand, on the east coast of North Island; area, 3,050,000 acres, containing much fertile soil, well adapted for agricultural and pastoral purposes. The capital is Napier. Pop. 8775.

Hawkesbury, a river in New South Wales, flowing into the Pacific near Sydney, and remarkable for its inundations.

Hawking. See *Falconry.*

Hawkins (hąk'inz), ANTHONY HOPE, author, born in London, England, in 1864; graduated at Oxford and was called to the bar in 1887, but devoted himself to literature instead of law. Among his works are *Man of Mark, Mr. Witt's Widow, Dolly Dialogues, Prisoner of Zenda, The Indiseretion of the Duehess, The Heart of the Prineess Osra, Phroso*, and a number of short stories.

Hawkins, SIR JOHN, an English sea commander, born at Plymouth, in 1520. He made several voyages in his youth in the slave trade and was defeated by the Spaniards in 1567. He was appointed vice-admiral and knighted for his services against the Spanish Armada, and in 1595 sailed, in company with Drake, against the Spanish colonies in the West Indies, but was unsuccessful. He died the same year.

Hawk-moth, one of the sphinx moths, so called from its hovering motion, which resembles that of a hawk looking for its prey. The death's-head hawk-moth is the *Acherontia atrŏpos;* the privet hawk-moth, the *Sphinx ligustri;* the humming-bird hawk-moth, the *Macroglossa stellatarum.*

Privet Hawk-moth.

Hawkweed (hąk'wēd; *Hieraeium*), a genus of composite plants, sub-order Cichoraceæ, consisting of numerous species with yellow flowers, common weeds in Britain and other parts of Europe. The pappus is brown and brittle, and in many species the leaves, involucres, and stems are hairy. They are perennial. *H. Canadense, H. venosum,* and *H. paniculatum* are American species.

Hawley (hą'lē), JOSEPH ROSWELL, statesman, was born at Stewartsville, North Carolina, in 1826. He studied law, and became prominent as a Republican writer and speaker. He served during the Civil war, and was mustered out as brevet major-general. In 1866 he was chosen governor of Connecticut, and in 1868 president of the Republican National Convention meeting at Chicago; was member of Congress, 1872-76, and in 1873-76 president of the United States Centennial Commission, in which he was largely instrumental in furthering the international exhibition at Philadelphia. In 1881-1905 he was United States senator. Died in 1905.

Hawser (hą'sėr), in ships, a small cable or a large rope, in size between a cable and a tow-line, used in warping, etc.

Hawthorn (hą'thorn), or WHITETHORN (*Cratægus Oxyaeantha*), a small spiny European tree, belonging to the sub-order Pomeæ of the order Rosaceæ, rising sometimes to the height of 20 to 25 feet. The leaves are alternate, obovate, 3 to 5 lobed; the flowers are white, sometimes with a reddish tinge, disposed in corymbs, and possess an agreeable perfume; the fruit is a drupe of a red color, and is edible. The species are about fifty in number, all shrubs or small trees. A number of them belong to the United States. When young the hawthorn springs up rapidly, and if pruned grows into a thick hedge. When it arrives at the height of a tree, however, it makes wood very slowly. The timber is hard and durable, and fit for many purposes of utility. The double-flower kind is one of the most ornamental for shrubberies. Hawthorn blossom is often called *May*, from the time of its flowering in England.

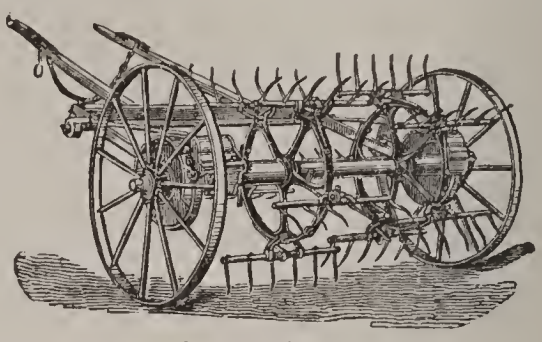
Hawthorne, NATHANIEL, a novelist of remarkable originality, born at Salem, Massachusetts, in 1804; died in 1864. He studied at Bowdoin College, where he took his degree in 1825 along with the poet Longfellow. For a number of years after this he led a retired and studious life in Salem, writing tales, some of which appeared in newspapers and magazines. In 1837 appeared

his *Twice-told Tales*, a collection of stories which he had contributed to various American periodicals. In 1838 he was appointed a weigher in the Boston custom-house, a post which he held for a few years. In 1846 he published his *Mosses from an Old Manse;* in 1850 *The Scarlet Letter;* in 1851 *The House of the Seven Gables;* and in 1852 *The Life of President Pierce*, and the *Blithedale Romance*. In 1853 he became American consul at Liverpool, a post which he held until 1857. He died at Plymouth, New Hampshire. Other works are his *Transformation* (1860), *Our Old Home* (1863), etc.—JULIAN, son of the above, born in 1846; also a novelist. In addition to a biography

Nathaniel Hawthorne.

of his father, he has written the novels of *Bressant*, *Idolatry*, *Fortune's Fool*, etc.

Hay (hā), the stems and leaves of grasses and other plants cut for fodder, dried in the sun, and stored usually in stacks. The time more suitable for mowing grass intended for hay is that in which the saccharine matter is most abundant in the plants, viz. when the grass is in full flower. For the operation of mowing, dry weather, and, if possible, that in which sunshine prevails, is chosen. The making of the grass into hay generally takes three or four days to get it ready for stacking. This period is principally occupied in alternately *tedding* (*i. e.* shaking out the grass loosely) and gathering it up into cocks or small heaps, previous to stacking. Care must be taken to avoid haymaking either under a scorching sun or during the prevalence of rain, and the cocks should never be opened in the morning until the disappearance of the dew. In stacking the great object is to preserve the freshness of the herbage, and to induce a slight degree of fermentation. If the weather has been wet a few layers of straw may be in-



Hay-tedder.

serted at intervals. Salting is also recommended. On large farms the tedding is performed by a tedding or haymaking machine.

Hay, JOHN, author and diplomat, born at Salem, Indiana, in 1838; was graduated at Brown University in 1858, and was admitted to the bar in 1861. In Washington, whither he went with President Lincoln, he acted as assistant secretary of the President. He was subsequently adjutant and aide-de-camp. He attained rank as colonel and assistant adjutant-general during the Civil war. He served as secretary of legation at Paris, 1865-67, when he became *chargé d'affaires* at Vienna. In 1869-70 he was secretary of legation at Madrid. On his return to the United States he joined the editorial staff of New York *Tribune*. His poems of *Little Breeches*, *Jim Bludsoe*, *Banty Tim*, etc., and *Castilian Days*, sketches of Spanish life, became very popular. President McKinley appointed him ambassador to Great Britain, whence he returned in 1898 to take the post of Secretary of State, a position which he filled with great ability and honor. He died July 1, 1905.

Hayden, FERDINAND VANDEVEER, an American geologist; born in Westfield, Massachusetts, in 1829. He was graduated at Oberlin in 1850, engaged in the Civil war as surgeon of volunteers, and was breveted lieutenant-colonel. With the exception of the time spent in the army, he occupied the years from 1853 to 1879 in exploration in the Rocky Mountains and the adjacent country. He edited the first eight reports (1867-1876) of the United States geographical and geological surveys of the territories, and is the author of several works on exploration in the West. He was a member of the National Academy of Science, of the Philadelphia Academy of Natural Sciences, and of other scientific societies in this and foreign countries. He died in 1887.

Haydn (hī'dn), JOSEPH, a celebrated German musical composer, born at Rohrau, on the borders of Hungary and Austria, 1732; died 1809. At the age of six he was sent to school at Haimburg, where he learned, among other things, singing and playing by rote. On account of the excellence of his voice he was appointed a choir-boy at St. Stephen's Church, Vienna. At the age of sixteen his voice began to break, and he lost his situation as chorister. Having made the acquaintance of Metastasio, Porpora, and Gluck, Hadyn gradually attracted attention by the brilliancy of his compositions; the *Creation* being his masterpiece.

Haydon (hā'dun), BENJAMIN ROBERT, an English historical painter, born in 1786; died by his own hand in 1846. In 1804 he became a student of the Royal Academy, and in 1807 exhibited his first work, *Joseph and Mary Reposing* (in Egypt), and his *Dentatus* in 1809. His *Judgment of Solomon* appeared in 1814. In 1815 he established a school in opposition to the Academy, an undertaking which ended in pecuniary failure in 1823. He was several times in prison for debt, was always complaining of injustice and neglect, and finally became deranged when he failed to be employed in decorating the new houses of parliament. He was the chief English historical painter of his time, and a man of great intellectual ability generally.

Hayes (hāz), ISAAC ISRAEL, Arctic explorer, born in Chester County, Pennsylvania, in 1832; died in 1881. He was a member of the expedition of 1853-55 under Dr. Kane, and himself commanded an expedition in 1860-61. He served as an army doctor during the war, and in 1869 he visited Greenland. He wrote *The Open Polar Sea*, and *The Land of Desolation*.

Hayes (hāz), RUTHERFORD BIRCHARD, President, was born at Delaware, Ohio, in 1822. He was a successful practitioner of the law until in 1861, at the outbreak of the Civil war, he was made major of volunteers. His conduct on the field was marked by conspicuous gallantry, and he attained by meritorious service the rank of brevet major-general. In 1865 he was elected a member of Congress, where he won the reputation of a good working member. In 1867, 1869, and 1875 he was elected governor of Ohio. In 1876 he was nominated for the Presidency against Samuel J. Tilden, the Democratic candidate. The election proved so close that the result was in doubt, both parties claiming a victory. An Electoral Commission, appointed by Congress, was required to decide the result of the election, which declared in favor of Mr. Hayes. His administration was conciliatory towards the South, and earnest in its efforts for the reform of the civil service. After his retirement from the presidency his life was one of good works. He died in 1893.

Hay Fever, or HAY ASTHMA, a complaint caused by the odors or pollen of flowering grasses, of a stable, or of certain drugs, such as ipecacuanha. It is frequently accompanied by asthma, and is in all cases distressing. Removal from the cause of the disease is beneficial, so are the smoking of tobacco, the inhalation of vapor of creosote, etc.

Haymarket Theater, one of the principal theaters of London. It was built in 1702, opened in 1720, made a theater royal, and rebuilt in 1767, when it was under the management of Foote. In 1821 it was again rebuilt under Nash.

Haynau (hī'nou), JULIUS JAKOB, an Austrian general, born in 1786; died in 1853. He took part in the battles of Austerlitz and Wagram, and was wounded in both. He also distinguished himself in the campaigns of 1813-15. In 1848 and 1849 he rendered valuable services to Austria against the Italians, took Brescia by storm, and visited it with unrelenting severity. He rendered important services in the Hungarian revolt, but incurred extreme odium by his cruel severity.

Hayne (hān), ISAAC, a Revolutionary martyr, was born in South Carolina in 1745. Taken prisoner at the capture of Charleston, he was paroled to visit his sick family. Afterwards required to join the British, he fled to the American camp, and was made colonel, but was soon captured, and hanged by Lord Rawdon.

Hayti (hā'ti), HAITI, or SAN DOMINGO (originally *Española;* Latin, *Hispaniola*), one of the West Indies, after Cuba the largest and one of the most fertile of these islands. It lies southeast from Cuba, and is separated from it by the Windward Passage, 50 miles broad. Its length is 400, and breadth 150 miles; area, about 28,000 square miles, or nearly as large as Scotland. It is of irregular form, and is intersected west to east by three chains of mountains, connected by offsets, with extensive plains and savannahs between. The central chain contains the highest peak, Loma Tina, 10,200 feet. The principal plain is the fertile Vega Real, between the northern and central ranges. The rivers are numerous, but of small size. The minerals include gold, silver,

quicksilver, etc., but are greatly neglected. Hayti as a whole is one of the healthiest of the West Indian Islands. The seasons are: a wet, during which heavy rains are most frequent in May and June; and a dry, during which little or no rain falls. The flora includes pines, mahogany trees, fustic, satin-wood, lignum vitæ, and other cabinet and dye woods, plantains, bananas, yams, batatas, oranges, pineapples, etc. The staple cultivated products are: coffee, sugar, indigo, cotton, tobacco, and cacao. The fauna includes the agouti, European cattle and pigs run wild, snakes, caymans, turtles, etc. Among the principal towns in Hayti are Port-au-Prince, San Domingo, Jacmel, and Cape Haytien.

Hayti was discovered by Columbus in 1492. It was then inhabited by perhaps 2,000,000 natives, but so ruthlessly did the Spaniards deal with the aborigines that within a century they practically exterminated them, having introduced negro slaves in their place. In 1630 the French settled in the western part of the island, and in 1697 the western portion was ceded to them, while the eastern remained Spanish. In 1791 the negroes revolted against France, and latterly the whole island came under the negro leader Toussaint L'Ouverture, who established an independent republic. He was captured, but in 1803 Dessalines headed a new insurrection, drove out the French, and was crowned emperor of Hayti. He was assassinated in 1806, and the Spaniards regained the eastern portion of the island. In 1821 the Spanish portion declared itself independent of the mother country, and assumed the name of Spanish Hayti; but it was subjugated by Boyer, the President of the Haytian Republic, or French Hayti. In 1844 the inhabitants of the Spanish portion rose, and formed themselves into a republic under the name of San Domingo (Republica Dominica). In 1861 Santana negotiated a reunion of the state with Spain, but Spain evacuated the island in 1865. From that period its history presents a long record of revolution and bloodshed, of which the gunpowder explosion that killed President Leconte in 1912, is typical. It now comprises the Republic of Hayti on the west side of the island, and the Dominican Republic on the east. Port-au-Prince is the capital of Hayti, and the population of the republic is roughly estimated at 780,000, consisting of negroes and mulattoes. San Domingo is the capital of the Dominican Republic, and the population of the latter state is estimated at 500,000, consisting also of negroes and mulattoes, with a considerable admixture of whites. In Hayti French is the prevailing dialect; in the Dominican Republic, Spanish. The area of the former comprises 10,204 square miles; that of the latter, 18,045 square miles.

Hazard (haz'ard), a game at dice played for money. The player is called the *caster*, and his opponent, who bets with him, is called the *setter*. The former calls a *main, i. e.* any number from 5 to 9 inclusive. He then throws with two dice, and wins if he 'nicks.' Five is a nick to 5; 6 and 12 are nicks to 6; 7 and 11 to 7, etc. The caster loses or 'throws out' if he throws aces, or deuce ace (called *crabs*). Hazard is a game involving nice calculations.

Hazaribagh (ha-zär-i-bäg'), chief town of the district of the same name, in Chota Nagpur, Bengal. Pop. 15,306. The district contains 7021 square miles. Pop. 1,104,742.

Hazebrouck (äz-bruk), a town of France, dep. Nord, having a fine church with an open spire 240 feet high. It has linen manufactures, breweries, tanneries, dye-works, etc. Pop. 9194.

Hazel (hā'zel; *Corylus*), a genus of shrubs or small trees of the order Corylaceæ or Cupuliferæ. It belongs to Europe, North Africa, Asia, and North America. The leaves are roundish-cordate, alternate, and shortly petiolate. The European hazel (*C. Avellāna*) produces the nuts called filberts, and grows best in a tolerably dry soil. It bears male and female flowers, the former composing cylindrical catkins. The hazel-nut oil is little inferior in flavor to that of almonds. Hazel branches form excellent walking-sticks, fishing-rods, etc., and the wood produces good charcoal, often employed by painters. The American hazel (*C. americāna*) very much resembles the European. The roots are used by cabinet-makers for veneering; and in Italy the chips are sometimes put into turbid wine for the purpose of fining it.

Hazel-grouse (*Bonāsa betulīna*), a species of grouse inhabiting the continent of Europe and great part of Asia, allied to the ruffed grouse of America.

Hazeline (hā'zel-ēn), an alcoholic liquid distilled from the fresh leaves of the *Hamamēlis Virginica*, the witch-hazel, native to the United States. It is exceedingly useful as an application to wounds, stanching the bleeding and promoting healing. It is equally useful for bruises, inflammatory swellings, sprains, and the like. It is applied on a pledget of lint to bleeding piles. In internal bleeding, whether from the lungs, stomach, or bowels, it gives very satisfac-

tory results. There are several officinal preparations of the witch-hazel, a fluid extract and a tincture, the dose of the former being 15 to 60 drops, and of the latter 2 to 5. Hazeline is the name given to a clear colorless liquid prepared by certain chemists, but not officinal, of which a teaspoonful may be given.

Hazleton (hāz'el-tun), a city of Luzerne County, Pennsylvania, 22 miles S. of Wilkes-Barre. It is in the anthracite coal region, being surrounded by very large collieries, and has silk, knitting, lumber, and planing mills, iron and pump works, shirt factory, etc. A state miners' hospital is here. Pop. 25,452.

Hazlitt (haz'lit), WILLIAM, English critic and essayist, son of a Unitarian minister, was born at Maidstone in 1778; died in 1830. In 1793 he became a student in the Unitarian College, Hackney, but on leaving it devoted his time to portrait painting. This was in its turn renounced for literature, his first publication being an essay *On the Principles of Human Action*, 1805. He delivered various series of lectures, and contributed to the *Edinburgh Review*, etc. Among his chief works are: *Characters of Shakespeare's Plays*, *A View of the English Stage*, *Lectures on the English Poets*, *Lectures on the English Comic Writers*, *Table Talk*, *Lectures on the Elizabethan Age*, *Life of Napoleon Bonaparte*, and essays, written in conjunction with Leigh Hunt, published under the title of the Round Table.—WILLIAM CAREW, born in 1834, grandson of the above, became an industrious author and editor, among his publications being *History of the Venetian Republic; Remains of the Early Popular Party of England; Memoirs of William Hazlitt; Bibliography of Old English Literature; New Edition of Warton's History of English Poetry;* etc.

Head (hed), the term applied to the anterior part of the body of an animal when marked off by a difference in size, or by a constriction (neck). A gradual increase of complexity in the structure of the head is observable as we ascend from the lowest to the highest forms of life. In the Protozoa, Infusoria, and Cœlenterates nothing that can be regarded as a head is found, and it is not till we ascend to the worms proper, the articulated animals (crustaceans, myriapods, spiders, and insects), the land and freshwater gasteropods (snails and whelks), and the cuttle-fishes, that a head proper is found. The cuttle-fishes have a remarkable cartilaginous box, which, like a skull, protects their anterior nervous ganglia, and gives support to the muscles. The head of the vertebrated animals presents a regular series of increasing complexity from the lancelet upwards, and as the anterior nervous mass enlarges, and its ganglia increase in complexity, so do the anterior vertebræ change their character; as the brain becomes specialized, so does the brain-case or skull, attaining its highest development in man. In man, and in the higher vertebrates, the head consists of an upper chamber, lodging the brain, the eyes, and other sense organs, and a lower, lodging the first portion of the alimentary canal. In proportion as the vertebrates become developed, the brain increases in size, and its position advances anteriorly, until, in man, it comes to overhang the face. The head is the seat of intelligence and of consciousness, as it contains the brain and the organs of sense, touch being the only sense not limited to it. See *Skull*.

Head, SIR FRANCIS BOND, miscellaneous writer, brother of the following, born 1793; died 1875. He was present at the battle of Waterloo, being in the royal engineers; in 1825 undertook the working of gold and silver mines in Rio de la Plata; in 1835 became governor of Upper Canada, and in 1838 suppressed the Canadian insurrection, and was made a baronet. He was the author of *Bubbles from the Brunnen of Nassau*, *Rough Notes of Rapid Journeys across the Pampas*, *A Faggot of French Sticks*, *The Horse and his Rider*, etc.

Head, SIR GEORGE, a writer of travels, etc., born in 1782; died in 1855. He held various posts in the army, and was present at most of the great battles of the Peninsula. In 1814 he proceeded to Canada to be chief of the commissariat of a proposed navy on the Canadian lakes, and subsequently published his experiences in *Forest Scenes and Incidents in the Wilds of North America*. He was knighted in 1831. He also wrote *Rome, A Tour of Many Days*, translations of Pacca's *Memoirs*, and of Apuleius, with other works.

Headache (*Cephalalgia*), arises from a variety of causes. The principal forms it assumes are:—(1) *Congestive Headache*, arising from overfulness of blood. It may be cured by purgatives, while reduction of the diet and saline medicines are beneficial. (2) *Anæmic Headache*, which arises from a deficiency of blood, and occurs in persons badly fed or in weak girls. Good food and iron tonic, with application of cold to the head, are often of service in such cases. (3) *Nervous Headache*, which often attacks the studious, and which is relieved by nerve tonics, and especially by phosphorus pills. (4) *Neuralgic Head-*

aehe, which is often due to exposure to cold. What is called *Hemicrania* or *Megrim,* which is the limitation of the headache to one-half or less of the head, is often treated with bromide of potassium. In cases in which headache arises from disease of the liver, nausea results, and this characterizes *bilious* headache. Impurity of blood and gouty affections, as well as disease of the kidneys, are frequent sources of headache.

Head Hunters, a title given to several tribes, including the Dyaks of Borneo, the Kyans of Celebes, the natives of Formosa, etc., on account of their savage mania of hunting for human heads, chiefly by nocturnal raids, and treasuring them as trophies. The practice resembles the scalp-taking of the American Indians.

Headley, Joel Tyler, historian, was born in Delaware county, New York, in 1814; was graduated at Union College in 1839. In 1855 he was elected secretary of state for New York. He was the author of numerous works of history and biography, including *Napoleon and his Marshals* (1846), *Oliver Cromwell* (1848), *The Second War Between England and the United States* (1853), *Life of Washington* (1854), and *The Great Rebellion* (1863-66). He died in 1897.—His brother, Phineas Camp (1819-1901), a Presbyterian minister, wrote *Women of the Bible, Public Men of To-day,* Lives of Josephine, Kossuth, Grant, etc., and many other works.

Healds. See *Heddles.*

Health (helth) is that condition of the living body in which all the bodily functions are performed easily and perfectly, and unattended with pain. The most perfect state of health is generally connected with a certain condition of the bodily organs, and well marked by certain external signs. See *Sanitary Science.*

Health, Bill of. See *Bill.*

Health, Municipal Boards of, in the United States, are institutions organized under city government, and deriving powers from state laws for the purpose of protecting the health of the citizens. Every city of importance has a municipal board of health.—State Boards of, institutions established by state legislative enactments, intended to have a central advisory relation with local sanitary organizations, and to superintend a state system of vital statistics. They have been created in most of the states, and in the District of Columbia, with ever-widening activities.

Hearing. See *Ear* and *Acoustics.*

Hearn, Lafcadio, author, born in the Ionian Islands in 1850, resided for many years in New Orleans and New York, and later in Japan. His *Two Years in the French West Indies* is an example of poetical prose that attracted much attention. He wrote also *Glimpses of Unfamiliar Japan,* and other works. He died in 1904.

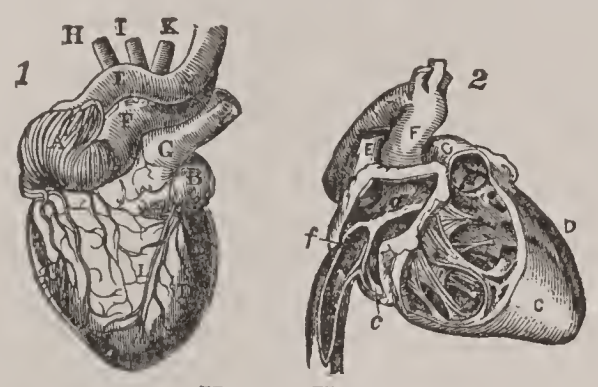
Hearne (hêrn), Thomas, an English antiquary, born in 1678; died in 1735. Hearne studied at Oxford, and was in 1701 appointed assistant keeper of the Bodleian Library, and he held the post of second librarian from 1712 to 1715, but had to resign as his Jacobite principles precluded him from taking the oaths to the government. Among his works may be mentioned *Ductor Historicus, Reliquiæ Bodleianæ, History and Antiquities of Glastonbury,* editions of Leland, of Spelman's *Life of Alfred,* Fordun's *Scotichronicon,* etc.

Hearst, Phebe, philanthropist, born in 1842, her maiden name being Apperson. In 1861, she was married to George F. Hearst, late United States Senator from California, who died in 1891. He left her very wealthy, and she donated from $3,000,000 to $4,000,000 to the University of California for buildings, having previously paid the cost of a competition of the best architects of Europe and America for the plans. She also gave $200,000 to the American University, Washington, D. C., to build a National Cathedral School for girls, and considerable sums for other educational and charitable work.

Hearst, William Randolph, son of the preceding, born in San Francisco, California, in 1863. He became a journalist in early life, and was editor and proprietor of the *San Francisco Examiner* in 1886. In 1895 he bought the *New York Journal,* and later bought the *Advertiser* and renamed it the *American,* and started the *Chicago American* and *Morning Examiner,* the *Boston American,* and the *Los Angeles Examiner.* He engaged actively in politics, made himself prominent by his radical newspaper methods, was elected to Congress in 1903 and 1905, and was a candidate for the Democratic Presidential nomination in 1904. He ran for mayor of New York City in 1905, for governor of New York State in 1906, and for mayor again in 1909.

Heart (hart), a hollow muscular organ, the function of which is to maintain the circulation of the blood, the organs of circulation being the heart,

the arteries, the veins, and the capillary vessels. The heart in men, quadrupeds, birds, and some reptiles is composed of four cavities, two *auricles* and two *ventricles*. It is enveloped in a membrane called the *pericardium*, and is situated toward the left of the cavity of the chest, between the lungs. With each beat the apex of the heart strikes against the wall of the chest in the space between the fifth and sixth ribs, a little below and to the right of the left nipple. The right auricle communicates with the right ventricle, besides which there are in it three openings, that of the *vena cava inferior*, that of the *vena cava superior*, and that of the *coronary vein*. The communication between this auricle and ventricle is closed by a valve when the ventricle contracts. The right ventricle communicates with the pulmonary artery, the opening into the artery being guarded by a valve formed of three flaps. When these are brought together they interrupt the communication between the ventricle and the artery. The left auricle communicates through a valved opening with the left ventricle, and contains the orifices of the four pulmonary veins. The left ventricle, besides the communication with the left auricle, contains the orifice of the aorta, also provided with a valve similar to that of the pulmonary artery. The auricle and ventricle of one side are separated from those of the other by a complete muscular partition, the *scptum cordis*. The valves at the openings of the arteries are called *semilunar*, that at the orifice of the right auricle *tricuspid*, that at the orifice of the left auricle *mitral*, and that at the orifice of the vena cava inferior the *Eustachian* valve. The heart is formed of a firm thick muscular tissue, composed of fibers interlacing so as to form a figure of eight. It also contains nerves and vessels. The arteries carry the blood from the heart to all parts of the body. They terminate in the capillary vessels, a series of extremely minute tubes which pass over into the veins. The veins are the channels by which the blood passes back from the body to the right auricle of the heart. The blood which is returned from the veins is purplish red, from excess of carbonic acid gas and deficiency in oxygen, and is called *venous;* that which leaves the heart is bright red, being oxygenated, and is called *arterial*. The venous blood parts with its excess of carbonic acid and receives new supplies of oxygen in the capillary system of the lungs, flows into the pulmonary veins, thence into the left cavities of the heart, thence it passes into the aorta, and is transmitted to all parts of the body, returning to the veins by the capillary system. It is now become venous, passes through the veins from the extremities towards the heart, receiving the chyle and the lymph, and is emptied into the right cavities of that organ, which returns it through the pulmonary artery to the capillary vessels of the lungs, where it is subjected to the influence of the air, resumes the qualities of red or arterial blood, and is ready for a new course.



HUMAN HEART.

Fig. 1, Exterior. A, Right auricle. B, Left auricle. C, Right ventricle. D, Left ventricle. E, Vena cava superior. F, Aorta. G, Pulmonary artery. H, Brachiocephalic trunk. I, Left primitive carotid artery. K, Left subclavian artery. L, Left coronary artery.

Fig. 2, Section, right side. C, D, E, F, G as in Fig. 1. *a*, Cavity of right auricle. *b*, Inferior vena cava. *c*, Coronary valve. *d*, Entrance of the auriculo-ventricular opening. *e*, Valve of the pulmonary artery. *f*, Fossa ovalis.

The mechanism of the circulation is as follows:—The blood contained in the two venæ cavæ is poured into the right auricle, which contracts, and thus forces the fluid to escape; but the venæ cavæ oppose to its backward passage the column of blood which they contain, and it must therefore pass into the right ventricle. The ventricle then contracts, and the tricuspid valve closing the passage through which the liquid entered, it is forced into the pulmonary artery, along which it must flow (return to the ventricle being prevented by the semilunar valve) into the capillary system of the lungs, whence it passes into the pulmonary veins, which pour it into the left auricle by four orifices. The contraction of the auricle impels it into the left ventricle, by which it is driven forward into the aorta (the mitral valve preventing its return into the auricle), and thence into the general circulation. The two auricles contract and relax simultaneously with each other, as do also the two ventricles. The relaxation is called *diastole;* the contraction *systole*. The quantity of blood projected at each systole is generally estimated at six ounces. The causes of the alternate contraction and relaxation are

entirely involuntary and dependent on the nervous system to a large extent. The systole of the ventricles is the cause of the motion of the blood in the arteries, which dilate with each wave driven into them.

The heart is the seat of various and generally dangerous diseases. One of these is *perieardítis* or inflammation of the pericardium, the double lining membrane or bag enveloping the heart. The cause of this disease may be exposure to cold, or an injury, or it may be complicated with other diseases. Inflammation of the inner lining is termed *endocarditis. Valvular* disease is a common affection of the heart, the valves becoming thickened, contracted, rigid, or otherwise affected, so that they cannot properly perform their duty. The mitral valve, for instance, may become too narrow and contracted, and the result is that all the blood does not pass into the aorta. In other cases of valvular disease, the same result follows, viz. imperfect depletion of the ventricles and auricles, the return of blood being termed *regurgitation.* The heart consequently becomes weakened, while the entire system suffers. *Overgrowth* or *hypertrophy* and *dilatation* are frequent results of valvular disease. In such cases the avoidance of violent exercises and emotions is necessary. The use of *digitalis* is often successful in strengthening and soothing the heart. Certain diseases produce atrophy, in which the heart becomes feeble in action, while *fatty degeneration* occurs when the muscular fibers are replaced by oleaginous particles. This renders the heart peculiarly liable to rupture under any strain or violent emotion, hence such should be carefully avoided by patients. Among other organic diseases of the heart are *angina peetoris* (the cause of which is uncertain), distinguished by a sense of strangling or suffocation in the breast. *Neuralgia* of the heart is similar in symptoms to angina. A very common heart ailment is *palpitation*, often caused by indigestion, and the excessive use of tea and tobacco. *Syncope* or *fainting* results from the sudden cessation or slowing of the heart's action, and may be caused by excitement, emotion, or shock of some kind. Some of the above forms of heart disease can be discovered only by auscultation or percussion; others are very evident even to non-professional observers.

Heart's-ease. See *Violet.*

Heart-urchin, the name applied to certain genera of sea-urchins on account of their cordate or heart shape.

Heat (hēt), the name given to a peculiar sensation, and also to the agent which produces it, this being now believed to be a certain motion in the minute molecules of which all bodies are composed.

One of the most obvious effects of heat is to alter the *temperature* of bodies. In almost all cases when heat is supplied to a body, the temperature of the body rises, and when heat is removed the temperature of the body falls. If the increase of temperature is evident, and such as may be noted by the thermometer, the heat is then termed *sensible;* if not, as in the case of ice immediately melted, it is termed *latent.* Temperature is, in fact, the tendency that a body has to impart heat to other bodies. If two bodies impart no heat to each other when in contact, they are said to have the same temperature. When the one possesses more heat than the other there is an impartation of heat from the former until the temperature is equalized. Different bodies require very different amounts of heat in order to raise their temperature through the same number of degrees. Thus it requires about thirty times as much heat to raise the temperature of 1 lb. of water 1° as to raise the temperature of 1 lb. of mercury by the same amount. The terms *capacity for heat* and *specific heat* are used in relation to this property of bodies. The capacity for heat of a body is the quantity of heat required to raise its temperature 1° from some fixed point, as from 0° C., or from 32° Fah. The specific heat of a substance is the ratio between the quantity of heat required to raise the temperature of the substance 1° from some fixed point and the quantity of heat required to raise the temperature of an equal mass of distilled water 1° from 0° C.

Heat changes the *dimensions* of bodies. Increase of volume is the normal effect, although the reverse is observed in water between 0° C. and 4° C., and in iron and bismuth. Between moderate limits bodies expand nearly regularly with the temperature, but this does not hold good of the more extreme limits. (See *Expansion.*) Addition of heat *liquefies solid bodies*, and converts *liquids into gases.* During the conversion of a solid into a liquid, or a liquid into a gas, a considerable quantity of heat is absorbed, and in the reverse process heat is given out; but this is one of the cases in which, though heat is taken in or given out, the temperature is not altered. Hence the heat is said to be made *latent.* Heat also alters the power of bodies for *conducting electricity.* In solids the conductivity is diminished

to a great extent by an increase of a few degrees in the temperature. In liquids, on the other hand, increase of temperature increases the conductivity. The magnetic properties of bodies are also changed by heat. For example, an iron bar that has been magnetized suddenly loses the whole of its magnetism at a particular temperature. Heat possesses the power of altering the *chemical propertics* of bodies. In some cases it breaks up chemical compounds, but in general it favors chemical combination.

In measuring quantities of heat various units may be adopted, as, for instance, the quantity necessary to melt a pound of ice. But the unit quantity of heat now generally fixed on (the Centigrade thermometer and metrical system being employed) is the quantity of heat which will raise the temperature of 1 gramme of distilled water from 0° C. to 1° C.; or 1 lb. of water may be used instead of 1 gramme, and one degree Fahrenheit instead of one degree Centigrade. *Calorimetry* is the technical name given to the part of the subject that deals with the practical measurement of quantities of heat.

When heat is applied to one end of a bar of iron it is propagated through the substance of the bar, producing a rise of temperature which is first perceptible at near, and afterwards at remote portions. This transmission of heat is called *conductivity.* The best *conductors* are metals, but all bodies conduct more or less. The best conductor is silver, next follow in order of their conductivity copper, gold, brass, zinc, tin, steel, iron, lead. With the exception of mercury and other melted metals, liquids are exceedingly bad conductors of heat. This can be shown by heating the upper part of a column of liquid and observing the variations of temperature below. These will be found to be scarcely perceptible and to be very slowly produced. If the heat were applied below we should have the process called the *convection of heat;* the lower layers of liquid would rise to the surface, and be replaced by others which would rise in their turn, thus producing a circulation and a general heating of the liquid. When the heat is applied above the expanded layers remain in their place, and the rest of the liquid can be heated by conduction and radiation only.

Radiation of heat consists in the propagation of heat from a hotter body to a colder one through an intervening medium which is not heated during the process. The heat is transmitted by the same medium that transmits light from a luminous body. Radiant heat and light are, in fact, the same thing, namely, vibrations of an elastic medium, the luminiferous ether, supposed to fill all space, and they obey the same laws of reflection, refraction, interference, and polarization. They also obey the general laws of wave-motion. A luminous body excites in the ether waves or undulations of a great many different wave-lengths, some of them capable of affecting the eye as light, and others not. Heat rays need not be at all luminous; they may have no light-giving power, but may be what are known as rays of *dark heat*, capable of being detected by the thermometer, but not perceptible to the eye. Other rays are purely *chemical* in their effect (as in photography), and are called *actinic* rays. The general effect of radiation is to equalize the temperature of any system of bodies so placed as to be capable of radiating one to the other. Every body of the system is constantly sending forth heat rays in all directions, and receiving the heat radiated from the other bodies. But the hotter bodies emit more than they receive, while the colder bodies receive more than they emit, and the temperature of the system is thus gradually equalized. The rapidity or otherwise of radiation differs much in different bodies. The radiation depends on the nature of the surface of the body, and the power of a body to radiate heat is intimately connected with its power of absorbing heat radiated to it, and with its power of reflecting heat. Surfaces that are good radiators are good absorbers, and surfaces that absorb heat readily reflect it badly. Thus, a kettle covered with soot loses, when filled with hot water, heat more rapidly than one with a brightly polished surface. The best absorber of all is a surface covered with a thin coating of lampblack. Brightly polished metals are the worst absorbers among the bodies that are not transparent to radiant heat.

The transmission of radiant heat through various substances is a subject of great importance. In this connection the terms *diathermanous* and *athermanous* correspond to *transparent* and *opaque* in the case of light. One of the chief diathermanous bodies is rock-salt. Common white glass transmits rays of high refrangibility, stopping those of low refrangibility. Hence its use as a fire screen. For the greater part of the heat of a common fire is of the dark kind, and is nearly all stopped by the glass; but glass does not screen from the heat of the sun, a great part of which consists of heat of high refrangibility. On the other hand, smoked rock-salt transmits very little of the heat of high refrangibility, though it

is almost perfectly diathermanous to dark heat.

The nature of heat was long a subject of active controversy. The common theory during the last century, and in the early part of the present, was the *materialistie*, or that by which heat was regarded as an imponderable fluid (*caloric*) which could permeate all matter, and which, uniting with the particles of bodies, produced the phenomena associated with heat. The materialistic theory was held by Black and Lavoisier, but it was exploded by the experiments of Rumford and Davy. Among the contributions of Davy to the science was his celebrated experiment of rubbing together two pieces of ice, while surrounded by an ice-cold atmosphere, until they melted away completely. He concluded that 'the immediate cause of the phenomenon of heat is motion, and the laws of its communication are precisely the same as the laws of the communication of motion.' Between 1840 and 1843 Joule conclusively established the truth of this theory —the *dynamieal theory* of heat—by measuring the amount of energy required to produce a definite heating effect, and by showing that the quantity of heat obtained by expending a definite amount of energy in friction is the same whatever is the nature of the body in which the friction takes place. The conclusions arrived at by him are thus given:—

1st. The quantitv of heat produced by the friction of bodies, whether solid or liquid, is always proportional to the quantity of work expended.

2d. The quantity of heat capable of increasing the temperature of 1 lb. of water by 1° Fah. requires for its evolution the expenditure of mechanical energy represented by the fall of 772 lbs. through 1 foot. This amount of energy or work, equal to 772 *foot-pounds*, is called the *dynamieal equivalent of heat.*

That heat is a form of energy is now considered by all to be beyond question. Every substance is considered to have some kind of molecular structure, and heat is regarded as consisting in the relative motions of the molecules or particles. The greater the energy of the motion the higher the temperature of the body, so long as it maintains its original state, solid, liquid, or gaseous; and an alteration in the nature of the motion probably constitutes the change from one of the states of matter to another. After the time of Rumford and Davy, Fourier and Carnot were highly distinguished for their inquiries into the mathematical theory of heat. Fourier investigated the theory of conduction and radiation, while on the investigations of Carnot has been founded the branch of Thermo-dynamics, which treats of the conversion of heat into mechanical force or energy, and *vice versâ.* (See *Thermo-dynamics.*) The investigations of Joule and the discovery of the quantitative equivalence of energy with heat, led to the enunciation of the theory of the *conservation of energy.* See *Energy.*

Heat-engine. See *Thermo-dynamic Engine.*

Heath (hēth), the common name of many plants of the nat. order Ericaceæ. Those that belong to the genus *Erīca* have their leaves simple and entire; their flowers oval, cylindrical, or even swelled at the base; the corolla is four-cleft; the stamens eight, terminated by anthers which are usually notched or bi-aristate at the summit, and the fruit dry, four or eight-celled. From 400 to 500 species are known, twelve or fifteen of which inhabit Europe, and have small flowers, whilst all the remainder are natives of South Africa (the vicinity of the Cape of Good Hope). Many of them bear brilliantly colored flowers.

Heathfield (hēth'fēld), George Augustus Elliot, Lord, a British general, born in Roxburghshire in 1718; died in 1790. He studied at the University of Leyden, and at the French military school at La Fère, and served for some time in the Prussian army. He entered the British army in 1735, was wounded at Dettingen in 1743, and in 1762 took part in the capture of Havana. In 1775 he became commander-in-chief of the forces in Ireland, and soon after governor of Gibraltar. Spain and France having sided with America against Britain, Gibraltar was besieged by the two former powers, and successfully defended by Elliot from 1779 to 1783, the siege and defence being among the most memorable in history. The king sent Elliot the order of the Bath, and shortly after he returned to England, and was created Baron Heathfield in 1787.

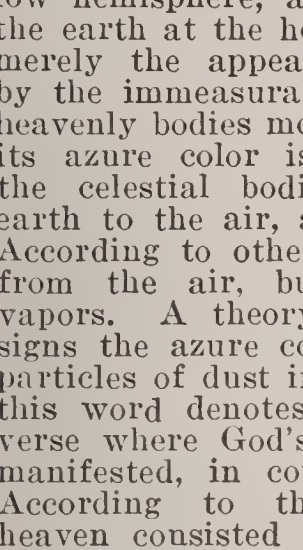
Heat Spectrum, the part of the spectrum from an incandescent body that contains invisible heat rays. To produce the heat spectrum properly lenses and prisms of rock-salt must be employed. When the spectrum from the sun is examined it is found that the maximum heat intensity is in the darkheat spectrum at a considerable distance from the place where light ceases to be perceptible.

Heaven (hev'n; probably signifying that which is *heaved* up or elevated), in a physical sense, the azure vault which spreads above us like a hol-

low hemisphere, and appears to rest on the earth at the horizon. It is in reality merely the appearance presented to us by the immeasurable space in which the heavenly bodies move. According to some its azure color is due to the light of the celestial bodies reflected from the earth to the air, and thence back again. According to others the reflection is not from the air, but from its contained vapors. A theory recently broached assigns the azure color to the presence of particles of dust in the air. In theology, this word denotes a region of the universe where God's presence is especially manifested, in contrast with the earth. According to the Hebrew scriptures heaven consisted of three regions:—(1) That of the clouds, or air; (2) that of the stars; and (3) the abode of God. They also divide it into two parts, 'The Heaven' and the 'Heaven of Heavens.' Among the Greeks the gods were supposed to reside on Olympus, and the classic poets placed the abode of the just in the Elysian fields. The heaven of Islam is a scene of sensuous enjoyment, while that of the Buddhist consists in *Nirvana*, regarded by some as meaning the absorption of individual existence in the great ocean of being. The ancient German had his Walhalla, and the American Indian has his happy hunting grounds. Among Christians the general opinion is that heaven is the residence of the Most High, the holy angels, and the spirits of just men made perfect, that this abode is eternal, and its joys intensely spiritual.

Heavy Spar. See *Baryta*.

Hebe (hē′bē), in Greek mythology, the goddess of youth, and the cup-bearer to the gods, until replaced by Ganymede, a daughter of Zeus and Hera, who gave her as a wife to Heracles. In the arts she is represented with the cup in which she presents the nectar, with the figure of a charming young girl, her dress adorned with roses, and wearing a wreath of flowers.



Hebe, by Canova.

Heber (he′bėr), Reginald, an English poet and bishop, was born in 1783; died in 1826. In 1800 he entered Brasenose College, Oxford, and in 1803 wrote his celebrated prize poem of *Palestine*. After traveling on the continent he became, in 1807, rector of Hodnet, and having married Amelia, daughter of the dean of St. Asaph, was appointed prebend of the cathedral. On the death of Bishop Middleton, Heber was consecrated Bishop of Calcutta in 1823; but he had only occupied the position for about two years when he died of apoplexy at Trichinopoli, in 1826. In addition to his hymns, the best known productions are *Palestine;* an edition of the works of Jeremy Taylor (with *Life*); *Poems and Translations.*

Hébert (ā-bār), Jacques René, notorious during the French revolution, was born at Alençon in 1757; was executed in 1794. Hébert first attracted notice as editor of the violent Jacobin organ *Le Père Duchesne.* In 1792 he became a member of the municipality of Paris, which contributed to the massacres of September, and he was named attorney-general under the commune. In 1793 the Girondists procured his arrest, but he was released by the convention. He was one of those who established the worship of reason, and he was always on the side of bloody measures. Having denounced Danton, the latter, in conjunction with Robespierre, secured his arrest and decapitation with the guillotine in 1794.

Hebrew Language and Literature (hē′brö), the language and literature of the Jews, Israelites, or Hebrews, especially at that period when they formed a compact nation inhabiting Canaan or Palestine. (For a sketch of the history of the people see *Jews.*) The Hebrew language forms a branch of the Semitic family of languages, being akin to the Aramaic (Chaldee and Syriac), Arabic, Ethiopic, and Assyrian. In the antiquity of its extant literary remains Hebrew far surpasses the other Semitic idioms, and in richness and development is only inferior to the Arabic. The language is deficient in grammatical technicalities, especially in moods and tenses of the verb, in the absence of the neuter gender, etc. Its roots are triliteral (consisting of three consonants), and words are derived from them by the reduplication of the letters of the root, and by the addition of formative elements before and after the roots. The alphabet is composed of twenty-two consonants, the vowels being expressed by marks above or below these letters. The accents and marks of punctuation amount to about forty. The writing is from right to left. There are three kinds of Hebrew alphabet now in use—the square or Assyrian (properly called the Babylonian), the

most common; the rabbinical, or mediæval; and the cursive, or alphabet used in ordinary writing.

The extant classical Hebrew writings embrace a period of more than 1000 years from the era of Moses to the date of the composition of the books of Chronicles, which stand last in the Hebrew Bible. During this period the written language underwent surprisingly little change. In passing from the book of Genesis to the books of Samuel we do not recognize any very striking difference in the language. Even those who assert that the Pentateuch as a whole is of a comparatively late era, admit the great antiquity of some of its contents, which do not differ in language from the rest. There is indeed to be observed a very decided difference in style and language between the earliest and the very latest Hebrew writings; but this change was sudden, hence Hebrew literature is distinguished into Pre-exilian and Post-exilian, the Babylonish captivity forming the break between the two. The writings which belong to the age subsequent to the Babylonish captivity differ very considerably from those which belong to the preceding age; the influence of the Aramaic or Chaldee language, acquired by the Jews in the land of their exile, having greatly corrupted the tongue. The historical books belonging to this age are the books of Chronicles, Ezra, Nehemiah, and Esther. In the prophets who prophesied during and after the captivity, with the exception of Daniel, the Aramaic impress is by no means so strong as we might anticipate, they having evidently formed their style on that of the older prophets. At what time Aramaic became the dominant element in the national language it is impossible to determine, but eventually it entirely took the place of the old Hebrew as a spoken tongue. The fragments of the popular language in the New Testament are all Aramaic; and ever since the Hebrew proper has been preserved and cultivated only as the language of the learned and of books, and not of common life.

After the return from the captivity, the Jewish literature was carefully cultivated. Under Ezra the Scriptures were collected, and arranged into a canon. The Pentateuch was publicly read, taught in schools, and translated into Aramaic. The legal or religious traditions explanatory or complementary to the law of Moses were collected and established as the oral law. These labors resulted in the *Midrash*, a general exposition of the Old Testament, divided into the *Halacha* and the *Haggada*. To the Maccabean era belong the *Apocrypha* (in Greek), various Greek versions of the Bible, and several collections of prayers, poems, and proverbs. To the succeeding epoch belong some celebrated doctors of the law—Hillel, Shammai, Gamaliel, and others; while the age following the destruction of Jerusalem (A.D. 70) witnessed the completion of the New Testament and the works of Josephus, written, however, in the Greek language. On being driven from their capital by the Romans, numerous schools were established by the Jews in which their language and literature were taught. Of these schools the most celebrated were those of Babylon and Tiberias. The *Mishna*, which contains the traditions of the Jews and interpretations of the Scriptures, is supposed to have been compiled in the latter part of the second or in the earlier part of the third century; and the rabbis of Tiberias and Babylon wrote numerous commentaries on it. These commentaries were at length collected into two separate works, the Jerusalem and the Babylonian *Talmuds*. The Jerusalem *Talmud* seems to have been completed about the end of the fourth century, and the Babylonian *Talmud* about a century later, under the care of Rabbi Ashe. What are called the *Targums*—that is Aramaic translations of portions of the Old Testament—belong partly to times somewhat anterior, partly to times subsequent to this period. The Jews latterly adopted the languages of the various peoples among whom they happened to dwell, though they also wrote in classical Hebrew as well as in the less pure form of the *Rabbinical* Hebrew. The most brilliant epoch of mediæval Jewish literature is that of the domination of the Moors in Spain. Of modern literature in the Hebrew language there is little that is of general interest.

Hebrews (hē′brōz), EPISTLE TO THE, one of the books of the New Testament, the canonicity and authorship of which have been much discussed. The immediate successors of the apostles (Clement of Rome, Justin Martyr, etc.) seem to have considered it as of canonical authority. Its canonicity was also maintained by St. Jerome, by the almost universal consent of the Latin and Greek churches, and by Ambrose of Milan; while in 416 a decretal of Innocent I was issued in favor of this view. As to the authorship, the early Roman church denied its Pauline origin. In Carthage it was (in the second century) ascribed to Barnabas, while at the same time in Alexandria it was ascribed to Paul. This view was supported by Clement of Alexandria, and Origen, the

former believing that it was written by Paul in Hebrew, and translated into Greek by Luke. Latterly the Pauline authorship became generally accepted throughout Christendom, but in modern times the prevalent opinion is that Paul was not the author. The epistle was probably addressed to a Jewish section of the Roman church, although some maintain that it was addressed to Jews of Alexandria. If the latter view be correct Apollos may be the author, although tradition seems to favor the claim of Barnabas. The question is apparently one incapable of settlement.

Hebrides (heb′-ri-dēz), or WESTERN ISLANDS (the *Heboudai* of Ptolemy, and *Hebudes* of Pliny, the *r* being an erroneous insertion), a series of islands and islets off the west coast of Scotland, usually divided into the Outer Hebrides (popularly called the Long Island), and the Inner Hebrides. The islands within the Firth of Clyde are not now considered as part of the Hebrides. The Hebrides are divided between the shires of Ross, Inverness, and Argyle. They number upwards of 400 in all, but only about 90 are inhabited; area, about 2800 square miles; population, about 100,000. The islands are, on the whole, mountainous, and abound in moss and moors. Although humid, the climate is mild. The soil is mostly poor, and agriculture, except in certain localities, especially Islay, is very backward. Oats and barley, with potatoes and turnips, constitute almost the entire produce of the soil. Cattle-rearing and fishing are staple industries. The land is mainly occupied by sheep-farmers, and by great numbers of crofters occupying small pieces of arable land and having often the right in common with others to a tract of rough pasture. There are also many cottars or subtenants, and excess of population has arisen in various localities from the minute subdivision of land. The condition of the inhabitants generally, is very depressed; their dwellings miserable—the older being without chimneys or windows—and their living poor. Gaelic is the universal language, although English is tolerably well known. The Hebrides were early colonized by Norwegians, and belonged to Norway from the ninth to the thirteenth century, being annexed to Scotland in 1265. In 1346 a chief of the Macdonald clan assumed the title of 'Lord of the Isles,' and he and his successors affected a sort of semi-independence, but the Hebrides were finally annexed by James V in 1540.

Hebron (hē′brun; anciently *Kirjath-arba* or *Mamre*, now *El-Khalil*), a town in Palestine, 18 miles south by west of Jerusalem, 2835 feet above sea-level. It lies in the narrow valley of Mamre, and was one of the three cities of refuge west of the Jordan. Its streets are narrow and dirty. A mosque, called *El-Haram*, formerly a church, contains the alleged tombs of Abraham, Isaac, Jacob, Sarah, etc. Hebron is one of the oldest of existing towns. It was the residence of Abraham and the patriarchs, and at one time of David. Pop. about 15,000.

Hecatæus (hek-a-tē′us), an eminent ancient Greek historian and geographer, born (probably) about 550 B.C.; died about 476 B.C. He visited Egypt, Thrace, Greece, the coasts of the Euxine, Italy, Spain, and Africa. His two great works were his *Tour of the World* and his *Genealogies* or *Histories*. Only fragments of his writings are extant.

Hecate (hek′â-tē, or he′kât), an ancient Greek goddess, whose powers were various. She could bestow wealth, victory, and wisdom; good luck on sailors and hunters; prosperity on youth and on the flocks. She was latterly confounded with other divinities, such as Demēter, Artĕmis, and Persephŏnē (Proserpine), and finally became especially an infernal goddess, and was invoked by magicians and witches. Dogs, honey, and black female lambs were offered to her at places where three roads met. She was often represented with three bodies or three heads, and with serpents twined round her neck.

Hecatomb (hek′a-tom, or hek′a-töm; Greek *hecaton*, a hundred, *bous*, an ox), in ancient Greek worship literally a sacrifice of a hundred oxen, but applied generally to the sacrifice of any large number. It was necessary that the victims should be without blemish. Only parts such as the thighs, legs, or hide were burned, the rest furnishing the festive meal at the close of the sacrifice.

Heckles (hek′lz), or HACKLES, an apparatus employed in the preparation of animal and vegetable fibers for spinning. It consists of a series of long metallic teeth, through which the material is drawn so as to comb the fibers out straight and fit them for the subsequent operations. The teeth are fixed in a wooden or metallic base, in several rows, alternating with each other at short distances apart.

Heckmondwike (hek′mund-wīk) a thriving town of England, county of York (West Riding), with extensive blanket, carpet, woolen

cloth, and woolen yarn manufactories. Pop. 9017.

Hecla, or HEKLA (hek'la), a volcano of Iceland, about 20 miles from its southwest coast, about 5000 feet in height, and having several craters. It is composed chiefly of basalt and lava, and is always covered with snow. Many eruptions are on record. One of the most tremendous occurred in 1783, after which the volcano remained quiescent till September, 1845, when it again became active, and continued with little intermission till November, 1846, to discharge ashes, some masses of pumice-stone, and a torrent of lava. The last outbreak was in 1878.

Hector (hek'tur), the son of Priam and Hecuba, the bravest of the Trojans, whose forces he commanded. His wife was Andromache. His exploits are celebrated in the *Iliad*. Having slain Patroclus, the friend of Achilles, the latter sought revenge, and Hector was slain by him. The body of Hector was dragged at the chariot wheels of the conqueror; but afterwards it was delivered to Priam for a ransom, who gave it a solemn burial. Hector is the most attractive warrior in Homer's *Iliad*, in which one of the finest episodes is his parting from Andromache before his last combat.

Hector, ANNIE ALEXANDER, an Irish novelist, born in 1825; died in 1902. Under the title of Mrs. Alexander she wrote many popular novels, among the best known of them being *Her Dearest Foe* and *The Wooing o't*.

Hecuba (hek'ū-ba), of Phrygia, in Greek legend the second wife of Priam, king of Troy, to whom she bore Hector, Paris, Cassandra, Troilus, and other children. After the fall of Troy she was given as a slave to Odysseus, and, according to one form of the legend, in despair leaped into the Hellespont.

Heddle (hed'l), in a loom, one of the parallel double threads which are arranged in sets, and with their mounting, compose the *harness* for raising the warp threads to form the shed and allow the shuttle to pass. Each heddle has a loop or eye in its center, through which a warp thread passes.

Hedera (hed'ér-a), the genus to which ivy belongs.

Hedge (hedj), a fence formed of living trees or shrubs. Hedges are often composed of one or more of the following:—Hawthorn, crab, blackthorn, holly, privet, beech, hornbeam, maple, barberry, furze, broom, alder, poplar, willow, yew, box, arborvitæ, sweet-briar, etc. Although superior to dry-stone walls, they take up much room, and exhaust the soil to some extent. Hedges are probably more common in England than in any other country, though they were not so common till the close of the seventeenth century. They are increasing in use in the United States, various plants being used, among which privet has recently become very popular.

Hedgehog (hedj'hog; *Erinacĕus Europæus*), an insectivorous animal, covered with spines in lieu of hair. By means of a special muscle it is able to roll itself up into a ball,

Hedgehog (*Erinacĕus Europæus*).

and in this form can defy most of its enemies. It has a rudimentary tail, elongated nose, short ears, with a cranium comparatively broad. The hind feet have five toes, and strong coarse hair covers some parts of the body. The teeth are numerous. Including the tail, it attains a length of 11 inches. It usually resides in small thickets, and feeds on fruits, roots, and insects. It is fond of raw or roasted flesh, and devours cockroaches in large numbers when kept in houses. It hibernates in winter. The female bears four to eight young at a birth, the young soon becoming covered with prickles. It is found in most parts of Europe. Other species are found in Asia and Africa.

Skull of common Hedgehog (*Erinacĕus Europæus*).

Hedgehog Plant, a name bestowed on leguminous plants of the genus *Medicāgo* (especially *M. infestata*) whose pods are spirally twisted and rolled up into a ball and furnished with prickles.

Hedge-hyssop. See *Gratiola.*

Hedge-mustard (*Sisymbrium officināle*), a cruciferous plant, formerly in use as a remedy for catarrh.

Hedge-warbler, or HEDGE-SPARROW (*Aecentor modulāris*), a bird of the family Sylviadæ, common in all the temperate parts of Europe. It feeds on insects, worms, and seeds; and its nest, built of green moss, roots, and wool, and lined with hair, is generally finished early in March. The cuckoo often deposits her egg in the hedge-warbler's nest.

Hedin, SVEN, a Swedish traveler, born at Stockholm in 1865. He traveled in Persia and Mesopotamia in 1885-86, was sent on an embassy to Persia in 1890, and continued his travels in Asia until 1897, crossing through East Turkestan, the Pamir, and North Tibet, Returning in 1906, he continued his explorations in an almost unknown region, the vast expanse of West Tibet, which he crossed twice from north to south, finding the country wildly mountainous, with intervening valleys and many lakes, generally salt. He returned in 1908, having discovered the true sources of the Bramaputra and Indus rivers. He wrote *Through Asia* and other works.

Hedjaz. See *Hejaz.*

Hedjrah. See *Hejra.*

Hedysarum (he-dis'a-rum). See *French Honeysuckle.*

Heem (hām), JAN DAVID DE, a Dutch painter of fruit, flowers, and still life, born in 1600; died in 1674. He studied under his father, and soon obtained large sums for his pictures, which are characterized by great delicacy and attention to detail and truth and brilliancy of coloring. His *Madonnas*, etc., bordered with garlands of fruits and flowers, were also famous.

Heeren (hā'rėn), ARNOLD HERMANN LUDWIG, a German historian, born in 1760; died in 1842. In 1776 he entered the gymnasium of Bremen, and in 1784 took his degree of Doctor of Philosophy at Göttingen. In 1787, after returning from his travels in Italy, he became professor extraordinary of philosophy at the same university. In 1801 he was elected professor of history. His writings combine extreme accuracy of statement with picturesqueness of style. His principal productions are *Geschichte der classischen Liter. im Mittelalter; Handbuch der Geschichte der Staaten des Alterthums*, etc.

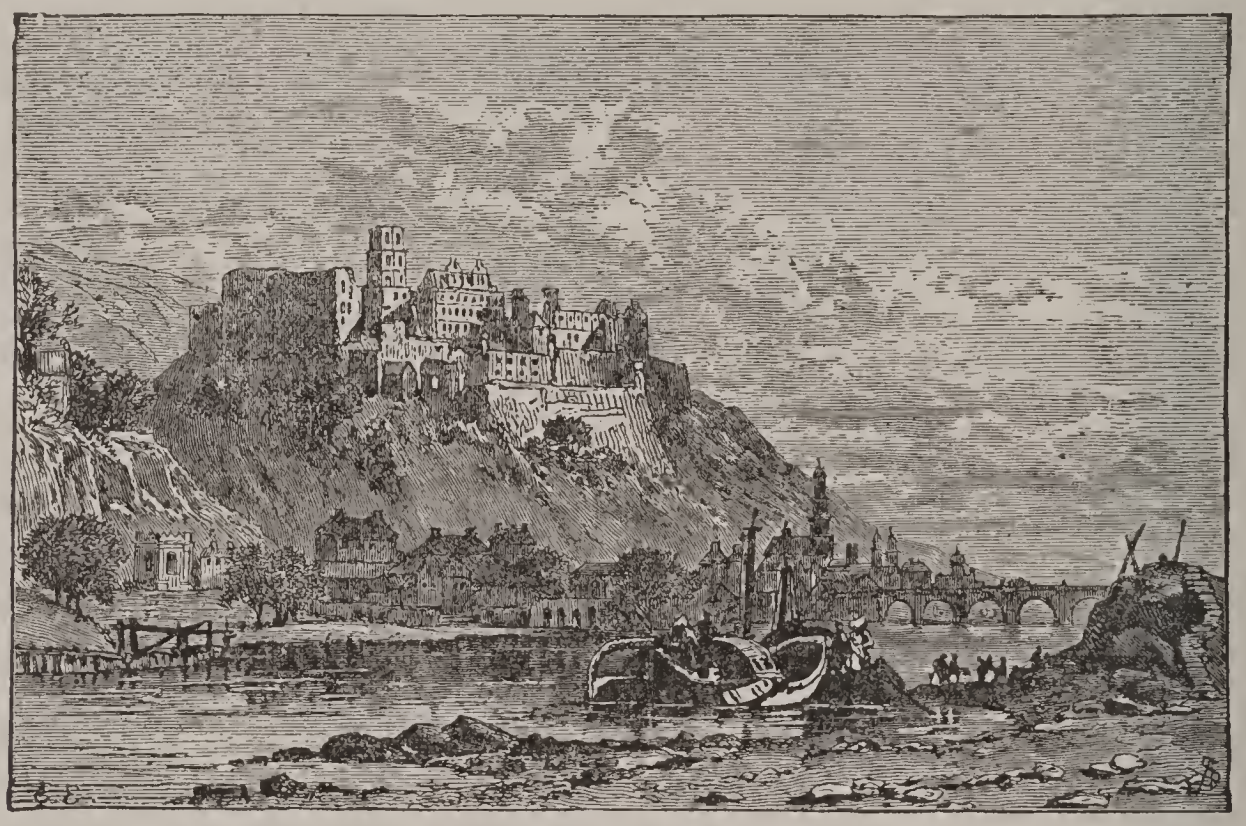
Hegel (hā'gl), GEORG WILHELM FRIEDRICH, a celebrated German metaphysician, born at Stuttgart in 1770; died in 1831. He studied at the theological institute of Tübingen from 1788-93, and was next a private tutor at Berne (1793-96), and subsequently at Frankfort-on-the-Main (1797-1800). Having removed to Jena, and contracted an intimacy with Schelling, he devoted himself to metaphysical study. After the battle of Jena, Hegel was employed on a newspaper at Bamberg until 1808, when he became successively rector of Nürnberg Gymnasium, professor of philosophy at Heidelberg (1816), and at Berlin from 1818 to his decease in 1831. Among his works the most important are his *Phänomenologie des Geistes* (1807), *Wissenschaft der Logik* (1812-16), *Encyclopädie der philosophischen Wissenschaften* (1817), and *Grundlinien der Philosophie des Rechts oder Naturrecht und Staatswissenschaft* (1821). The philosophy of Hegel followed that of Schelling, in adopting as a presupposition the indentity of Knowing and Being, of Thought and Reality, of Subjective and Objective. But he differs from Schelling, who contemplates this indentity with its inner opposites through the medium of a purely intellectual intuition, for Hegel seems rather to revert to Kant's Transcendental Logic. He thus asserts that if the order and connection of our thoughts is involved in the order and connection of things, the universal form in the course of objective action must exactly agree with the form of the development of our thoughts, and *vice versa*. As there are, according to him, three stages in the process of thought and existence, his system has necessarily a threefold division: logic; the philosophy of nature; and mental philosophy. Hegelianism has been more influential in the direction of the philosophy of religion than in any other department; but it is divided into three camps, representing respectively the supernatural, the rational, and the mystical.

Hegira (hej'i-ra.) See *Hejra.*

Heide (hī'dė), a town of Prussia, in Holstein, with manufactures of paper, etc. Pop. (1905) 8758.

Heidelberg (hī'dl-ber*h*), a town of Baden, beautifully situated on the left bank of the Neckar, here crossed by two bridges, in one of the loveliest districts of Germany. It stands on a narrow strip between the river and the castle-rock and Geisberg, spurs of the Königstuhl (1850 ft.); and chiefly consists of one main street and less important cross and parallel streets. The principal

buildings are: the church of St. Peter; the church of the Holy Ghost; the castle, anciently the residence of the Electors Palatine; the university, founded in 1386, and now possessed of a library of 500,000 volumes and attended by about 1000 students; the town-house, etc. The castle, begun late in the thirteenth century, and exhibiting elaborate examples of early and late renaissance architecture, is the most



Castle and Town of Heidelberg.

remarkable edifice in Heidelberg. It is now an ivy-clad ruin, but is carefully preserved from further decay. The principal industry is brewing. One of the greatest curiosities of the place is the Heidelberg tun, kept in a cellar under the castle. It is 36 feet in length, 26 in diameter, and capable of holding 800 hogsheads. Heidelberg is rich in public walks and fine views, that from the Königstuhl being of surpassing beauty. It was long the capital of the Palatinate, but was superseded by Mannheim in 1720. In 1622 Tilly captured and sacked the city. A similar fate overtook it in 1689 and 1693 at the hands of the French. Pop. (1905) 49,527.

Heidenheim (hī'dėn-hīm), a town of Würtemberg, 46 miles E. S. E. Stuttgart. It has manufactures of woolen and linen cloth, etc. Pop. (1905) 12,173.

Heights, Measurement of, or Hypsometry, is that department of geodesy which treats of the measurements of the absolute or relative heights of various points on the earth's surface. In all cases in which great accuracy is essential, trigonometrical methods must be employed, but in other cases sufficiently accurate results may be obtained by leveling, by the use of the barometer, or by the boiling-point of water as given by the thermometer. The trigonometrical method is often the only one available, as the height to be measured may be quite inaccessible. The barometric method is based on the fact that as the mercurial column is supported by the atmospheric pressure, it must fall when conveyed from a lower to a higher level, as in the latter case the pressure is diminished. Were the atmosphere uniform in density throughout, nothing could be simpler than the measurement of heights by the barometer, but gases being very compressible, the lower strata of the atmosphere are denser than the upper strata, being exposed to greater pressure. Thus a column of air 100 feet high has far greater weight at the sea-level than a similar column at the top of a mountain 4000 feet high; and the effect on the barometric column of rising 100 feet from sea-level is correspondingly greater than the effect of rising 100 feet from a height of 4000 feet above the level of the sea. Moreover, increase of temperature affects the density of the mercury in the barometer, and also that of the air, and further complicates the problem. Hence for the greatest accuracy in determining the difference of levels

two mercurial barometers and four thermometers are required. Two of the thermometers are used for determining the temperature of the air at the stations, and two are attached to the barometers for determining the temperature of the mercury. The observations are made simultaneously. The aneroid barometer is in some respects more suitable than the mercurial, being much more portable, and requiring two thermometers only. After the necessary observations are made the required height may be calculated by the use of certain logarithmic formulæ, or by the rough method stated under *Barometer*. Tables obviating the use of logarithms are often supplied by instrument makers along with aneroid barometers. The method in which use is made of the principle that water boils at the temperature of 212° under the full pressure of the atmosphere but at a lower temperature with a smaller atmospheric pressure, such as is given by an elevated position, is simple and sufficiently accurate for many purposes. It has been found that if water at the sea-level boils at 212°, on rising 510 feet it will boil at 211°, and so on.

Heilbronn (hīl-bron'), a town of Würtemberg, beautifully situated on the Neckar, largely mediæval in architecture in the older parts, but having modern suburbs. Its finest edifice is the old Gothic church of St. Kilian. It has flourishing industries. Heilbronn was long an imperial free town. Pop. (1905) 40,026.

Heiligenstadt (hī'li-gen-stât), a town of Prussia, prov. Saxony, on the Leine. It has cigar and other manufactures. Pop. 7955.

Heilprin (hīl'prin), ANGELO, geologist, born in Hungary in 1853, was brought to America in 1856, and became a student in and director of the Academy of Natural Sciences of Philadelphia. Was president for five years of the Geographical Society of Philadelphia, leader of the Peary Relief Expedition of 1892, and traveled in many countries. He wrote *Geographical and Geological Distribution of Animals, Geological Evidences of Evolution, The Aretic Problem*, with works describing the 1902 eruption of Mont Pelee, which he investigated. He died July 17, 1907.

Heimdall (hīm'dal), a divinity in the Scandinavian mythology, who keeps watch on the bridge Bifröst, which connects the domain of the Æsir or Gods with that of men. His sight and hearing are acuter than those of mortals, and nothing can evade his vigilance.

Heine (hī'nė), HEINRICH, a German poet and author, was born of Jewish parents at Düsseldorf in 1799, and died at Paris in 1856. He studied law at Bonn, Berlin, and Göttingen; took his degree at the last-mentioned place, and in 1825 embraced Christianity. He afterwards lived at Hamburg, Berlin, and Munich, but in 1830 he settled in Paris, supported himself by his literary labors, and dwelt there until his death. From 1837 to the overthrow of Louis Philippe in 1848 he enjoyed a pension of 4800 francs from the French government. Of the numerous literary works of Heine there may be mentioned in particular—*Gedichte* ('Poems'); *Reisebilder* ('Pictures of Travel'); *Buch der Lieder* ('Book of Songs'); *Deutschland Ein Wintermärchen* ('Germany, a Winter Tale'); *Atta Troll; Romanzero*, etc. As a poet Heine is remarkable for the simplicity and pathos of many of his lyric pieces. His powers of wit and raillery were also great, but he often transgressed the bounds of propriety and decorum. Scepticism and oversensuousness are his two prominent characteristics. During the latter years of his life he suffered great agony from a spinal complaint, which confined him almost constantly to bed.

Heineccius (hi-nek'se-us), JOHANN GOTTLIEB, a German writer on logic, jurisprudence, and ethics, born in 1681; died in 1741. His works on Roman law were highly valued.

Heinrich (hīn'ri*h*), the German form of *Henry*.

Heinsius (hīn'si-us), DANIEL, a Dutch scholar, poet, and critic, born 1580; died 1655. He studied at Franeker and Leyden, at the latter under Joseph Scaliger; became professor of history and politics at Leyden in 1605, and librarian and secretary in 1607. He published editions of Hesiod, Horace, Virgil, and other classical writings, and wrote Latin and Greek poems.

Heir (ār). See *Descent*.

Heir-apparent, the person who necessarily succeeds to the ancestor if he survives him, because no other person can ever gain precedence over him, as an eldest son. Compare *Heir-presumptive*.

Heirloom (ār'löm), in law, means some personal chattel which goes by special custom to the heir-at-law, together with the inheritance. The term is often applied to the case where certain chattels, such as pictures, etc., are directed by will to follow along with the estate.

Heir-presumptive is one who, if the ancestor should die immediately, would, under existing circumstances, be his heir, but whose right of inheritance may be defeated by some nearer heir being born, as an only daughter, who is displaced by the birth of a son. Compare *Heir-apparent.*

Hejaz (hej-äz′) or HIJAZ, a division of Arabia, extending along the north half of the east coast of the Red Sea, comprehending a lowland (Tehâma) and a tract of highlands, east of a range of mountains attaining a height of perhaps 8000 feet. Mecca, Medina, Jiddah, and Yambo are the chief towns, the first two being annually resorted to by vast numbers of pilgrims. Hejaz forms a part of the Turkish dominions.

Hejra, HEJIRA, or HEGIRA (hej′i-ra), an Arabic word signifying emigration. The Mohammedans designate by it the flight of Mohammed their prophet from Mecca to Medina. From this flight, which happened on the 13th of September, 622 A.D., but which they fix on the 16th of July of the same year, they begin their computation of time.

Hel, the Norse goddess of the dead, who dwells beneath one of the three roots of the ash Yggdrasil; daughter of Loki. Dark rivers surround her abode; a dog watches without; the horse she rides has three feet; she herself is half black and half of fair complexion.

Helamys (hel′a-mis), the jumping-hare or jumping-rat, a genus of rodent animals allied to the jerboas.

Helbeh (hel′be), the seed of a plant of the leguminous genus *Trigonella* (fenugreek), with a somewhat bitter taste, whose flour, mixed with dhurra, is used as food by the laborers of Egypt.

Helder (hel′dėr), a fortified seaport of Holland, in the most northern part of the province of North Holland, opposite the island of Texel, and commanding the entrance to the Zuider Zee. From a fishing town Napoleon converted it to a fortress and naval station of the first rank, and called it his Northern Gibraltar. Being much exposed, the port and coasts are protected by gigantic dikes, one 6 miles long and built entirely of Norwegian granite. Pop. 25,842.

Helen (hel′en), or HEL′ENA, in ancient Greek legend, the most beautiful woman of her age, daughter of Zeus by Leda. By advice of Ulysses her numerous suitors were bound by oath to respect her choice of a husband, and to maintain it even by arms. She chose Menelaus, but was afterwards carried off to Troy by Paris, the Trojan war arising from the claim made by Menelaus for the fulfilment of the oath. After the death of Paris she married his brother Deiphobus. On the fall of Troy she returned to Sparta with Menelaus, but was murdered at Rhodes.

Helena (hel′e-na), a city, capital of Phillips County, Arkansas, about 100 miles E. of Little Rock. It is on the Mississippi, 75 miles below Memphis, has cotton gins and presses and lumber mills and is an important cotton shipping point. Pop. 8772.

Helena, a city, capital of the state of Montana and of Lewis and Clark County, is in Prickly Pear Valley, near the Rocky Mountains, and 14 miles W. of the Missouri River. It is traversed by the North Pacific and Great Northern railroads. Here are rich gold mines, and silver, copper, and lead are found and mined. The city has smelters and other industries, and contains the state capitol and other public buildings. Pop. 12,515.

Helena, the name of several saints, of whom the chief was the mother of the Emperor Constantine the Great, a woman of humble origin, and a native either of Bithynia or of Britain. She became the wife of Constantius Chlorus, who, however, was compelled to repudiate her when made Cæsar by Diocletian in 292 A.D. At the same time he made her son his sole heir, and Constantine, on his accession, took her to reside with him at the palace, and gave her the title of Augusta. She did much for the advancement of religion, and is said to have discovered the *true cross*, in honor of which she founded the Church of the Holy Sepulcher at Jerusalem. She died shortly after at the age of eighty, in 328 or 326 A.D.

Helena (he-lē′na), ST., an island in the South Atlantic, belonging to Britain, about 850 miles southeast of the Island of Ascension, 1150 miles west from the west coast of S. Africa, and 2000 miles from the east coast of Brazil; greatest length, 10½ miles; greatest breadth, 7 miles; area, about 47 square miles. Its position, in the ocean thoroughfare from Europe to the East, has made it a place of call for vessels, while it has acquired special celebrity as the place of Napoleon's banishment, and where he resided from 1816 till his death in 1821. It has precipitous and almost inaccessible coasts, particularly on the north, where nearly perpendicular cliffs rise to a height of from 600 to 1200 feet. The only town on the island is James Town, which has a fine natural harbor,

and affords excellent anchorage in 12 fathoms. The island, which is of volcanic formation, derives its name from having been discovered by Juan de Nova Castilla on St. Helena's Day. It was afterwards possessed by the Dutch, and finally was ceded to the English about 1651. During the British-Boer War (1900) Com. Cronje and over 4000 of his army were deported here after their capture by the British under Gen. Kitchener. Pop. about 5000.

Helensburgh (hel′enz-bur-rō), a town of Scotland, in Dumbartonshire, at the entrance of the Gare Loch, on the north shore of the Firth of Clyde, opposite Greenock, from which it is distant about 4 miles. It is chiefly a residential town and summer resort for Glasgow and neighboring towns. It takes its name from Helen, wife of Sir James Colquhoun, by whom it was founded in 1777. Pop. 8554.

Helenus (hel′en-us), a Trojan soothsayer, son of Priam and Hecuba, twin-brother of Cassandra, and husband of Andromache after Hector's death. He foretold the destiny of Æneas.

Heliacal (he-lī′a-kal), in astronomy, rising or setting at the same time, or nearly the same time, as the sun. The heliacal rising of a star is when, after being in conjunction with the sun and invisible, it emerges from the light so as to be visible in the morning before sunrising. On the contrary, the heliacal setting of a star is when the sun approaches so near as to render it invisible by its superior splendor.

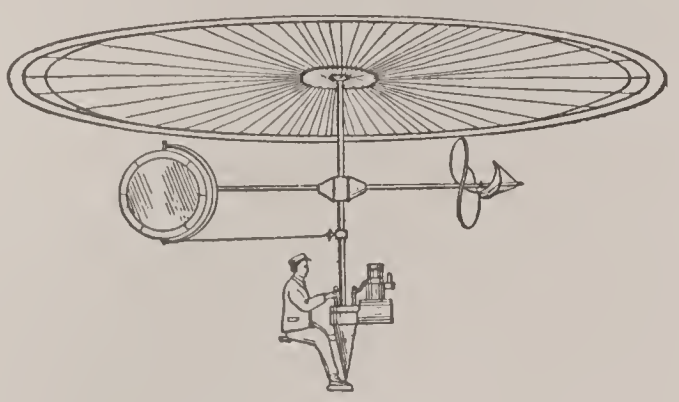
Helianthemum (hē-li-an′the-mum), a genus of herbaceous undershrubs and shrubby or creeping plants; the rock-rose genus.

Helianthus (hē-li-an′thus), a genus of Compositæ, chiefly North American annual or perennial herbs, with rough leaves and large yellow flowers, of which the common sunflower (*H. annuus*) and the *H. tuberōsus* (the Jerusalem artichoke) are examples.

Helicidæ (he-lis′i-dē), the general name by which the land shell-snails are distinguished. See *Helix*.

Helicon (hel′i-kon; now *Sagara*), a mountain range of Greece, in the west of Bœotia, in some sense a continuation of the range of Parnassus. It was the favorite seat of the Muses, who, with Apollo, had temples here. In it also were the fountains of Aganippe and Hippocrene. The highest summit, now called *Paleovuni*, is barely 5000 feet high.

Helicopter (hel′i-kop-tėr), an aeroplane flying machine with a vertical screw arrangement to lift it into the air, and other power apparatus to give it horizontal motion. It has



Villard's Helicopter.

not yet been practically realized, though some experiments have been made.

Helictis (hel-ik′tis), a genus of carnivorous quadrupeds, allied to the skunks, of which there are at least two species, one (*H. moschāta*) found in China, the other (*H. orientālis*) in Nepâl.

Helier (hel′yėr), St., the capital of the island of Jersey, on the south coast, on the east side of St. Aubin's Bay. It is protected by two fortresses, Elizabeth Castle on a rock in the bay, opposite the town; and Fort Regent, overlooking the inner harbor. The chief public building is the House of Assembly, which, however, has little architectural merit. The harbor, docks, and quays are commodious, and there is a considerable shipping trade. The mild climate and cheapness of living make it a favorite place of residence and summer resort. It is the seat of the states, or representative parliament of Jersey, and the terminus of two small railways. Pop. about 30,000.

Heligoland (hel′i-gō-land; Danish, *Helgoland*—Holy Land), an island belonging to Germany, in the North Sea, about 40 miles from the mouth of the Elbe; 1¼ miles long and ½ mile broad; highest point 200 feet. Its rocks, of reddish sandstone, present a perpendicular face to the sea, but are being rapidly corroded by the waves. The island produces potatoes, barley, and oats, but oysters and lobsters are the chief products. The town consists of about 400 houses, and is much resorted to for sea-bathing. The inhabitants, of Frisian descent, are mainly fishers, pilots, and lodging-house keepers. Heligoland was captured by Britain from Denmark in

1807, and conceded to Germany in 1890. Pop. 2307.

Heliodorus (hel-i-o-dō′rus), a Greek romance writer, born at Emesa, in Syria, in the fourth century. Though of the family of priests of the Syrian god of the sun, he became a Christian, and Bishop of Tricca in Thessaly. His youthful work, *Æthiopica*, or the *Loves of Theagenes and Charielcia*, is a tale of adventure in poetical prose, with an almost epic tone. It is, however, sometimes asserted that Heliodorus, the romance writer, was a Neo-Pythagorean sophist of the third century, who has been erroneously confounded with the bishop.

Heliogabalus (hel-i-o-gab′a-lus), or ELAGABALUS, a Roman emperor, son of Sextus Varius Marcellus; born about A.D. 205, and originally called *Varius Avitus Bassianus*. He received his name from having been, while still a child, priest of Elagabalus, the Syro-Phœnician sun-god. After the death of Macrinus he was invested, at the age of fourteen, with the imperial purple, but his licentiousness soon displeased the populace, and he was slain in an insurrection of the prætorians, A.D. 222, after a reign of less than four years.

Heliograph (hē′li-u-graf), or HELIOSTAT, a name given to various contrivances for reflecting the sun's light either temporarily or continuously to an observer at a distance. The simplest heliostat is a mirror hung up at a distant station so as to reflect a flash to the observer whose station may be many miles from it. This mirror is generally so adjusted that the flash occurs exactly at some prearranged hour, and by being in readiness the observer can get an observation with precision as regards time. Some heliostats are visible for 80 miles. By being fitted with an adjustment of clock-work, the mirror can be made to revolve with the sun, and thus reflect a beam of sunlight steadily in one direction, being then called also *heliotrope*. The heliostat has been used for signaling in war.

Heliogravure (hē-li-og′ra-vūr), or PHOTOGRAVURE, is a photo-mechanical printing process. A photograph of any object, as a painting, etc., is taken, and from the negative so obtained a positive print is made on gelatinized paper. This print is transferred upon a highly polished copper plate, and a solution of terchloride of iron is poured upon it. The iron penetrates through the gelatine and etches the picture upon the copper. The final result is the production of a photo-etched copper-plate, from which a large number of impressions can be taken.

Heliolite (hē′li-u-līt), a synonym of sunstone or avanturine felspar.

Heliometer (hē-li-om′e-tėr), an instrument for measuring small distances on the sky, particularly the apparent diameters of the sun and of the moon. It was invented by Bouguer in 1747, and improved by Dollond and Fraunhofer. In the common modern form the object-glass of the telescope is cut into two halves, relatively movable by a screw. Each half forms a perfect image in the focus of the eye-piece, and by varying the distance between the half-lenses the images may be made to diverge from, or approach, each other. If, in contemplating a celestial body, the object-glasses are placed so as to bring the images to touch each other, the distance of the centers of the object-glasses, measured in seconds, gives the diameter of the image.

Heliopolis (hē-li-op′u-lis; City of the Sun), the On, Rameses, or Beth-shemesh of the Hebrew Scriptures; now called Matarich; situated a little north of Memphis, and one of the most ancient and extensive cities of Egypt under the pharaohs. It had a magnificent temple dedicated to Re; and communicated with the Nile by lakes and canals. During the flourishing ages of the Egyptian monarchy the priests taught within the precincts of its temples, and both Eudoxus and Plato visited its famous schools. Here Joseph and Mary are said to have rested with the infant Christ. Near the village stands the Pillar of On, supposed to be the oldest Egyptian obelisk, 67½ feet high, and 6 feet broad at base. The Turks were defeated here by the French in 1800.

Heliopolis, in Cœlosyria. See *Baalbek*.

Helios (hē′li-os), the god of the sun (Latin, *Sol*) in the Greek mythology; son of Hyperion and Theia, and brother of Eos (Aurora, the dawn) and Selēnē (Luna, the moon). He dwells with Eos in the ocean behind Colchis, from which he issues in the morning, and to which he returns at night. His worship was extensively diffused, and he had temples in Corinth, Argos, Trœzene, and Elis, but particularly in Rhodes, the Colossus of which was a representation of Helois.

Helioscope (hē′li-u-skōp), a telescope fitted for viewing the sun without distressing the eyes, as when the image of the sun is received upon mirrors formed simply of surfaces

of transparent glass which reflect only a small portion of the light.

Heliostat. (hē'li-u-stat). See *Heliograph.*

Heliotrope (hē'li-u-trōp), a genus of plants (*Heliotropium*), nat. order Boraginaceæ. The species are herbs or undershrubs, mostly natives of the warmer parts of the world, and have alternate leaves and small flowers usually disposed in scorpioid cymes. *H. Europæum*, the common heliotrope, is indigenous in the south and west of Europe and has small white or pale red flowers with a fruit of four drupes under a thin fleshy covering. The *H. Peruvianum* is a very fragrant garden plant, growing to about 2 feet in height and bearing small lilac-blue flowers.

Heliotrope (Jenny Lind variety).

Heliotrope, the bloodstone, a variety of quartz, partaking of the character of jasper or of chalcedony. It is of a deep green color, and covered with red spots. It is hard, and is used for burnishers; the more finely-marked stones are prized for seals, signet-rings, etc. It is found in Tartary, Persia, Siberia; in the island of Rum, Scotland, and elsewhere. It received the name heliotrope, or elitropia, because it was said that if the mineral were put into water in a basin rubbed with the juice of the plant heliotrope, and were exposed to the sun, the water would appear red and the sun blood-like, as if it was eclipsed. The stone rubbed with the juice of the plant was said to render its wearer invisible.

Heliotype (hē'li-u-tīp), a photographic process by which pictures can be printed in the same manner as lithographs, depending on the fact that a dried film of gelatine and bichromate of potash, when exposed to light, is afterwards insoluble in water, while the portion not so exposed swells when steeped. A mixture of gelatine, bichromate of potash, chrome alum, and water is poured on a plate of glass, where it shortly settles into a film. When dried the film contracts and separates from the glass. A picture is then printed on it from a negative, after which it is attached to a plate of zinc, and copies are taken from it by inking it with lithographic ink exactly as in the ordinary lithographic process. The films are technically called 'skins.' Sometimes a gutta-percha mold is prepared from the film, and copper deposited on it by the electrotype process, the plate thus produced being printed from in the ordinary way.

Helium (hē'li-um), a newly-discovered element, first found in the sun by its spectral lines, and so named from being supposed to be peculiar to that body. It was discovered on the earth in 1895 in the Norwegian mineral cleveite, and has since been found in various connections. It is supposed to be identical with the alpha ray given off by radium. Its atomic weight is double that of hydrogen.

Helix (hē'liks), (1) a spiral line as of wire in a coil, or such a curve as is described by every point of a screw that is turned round in a fixed nut. (2) In architecture, a small volute or twist under the abacus of the Corinthian capital, of which in every perfect capital there are sixteen, two at each angle, and two meeting under the middle of each face of the abacus.

Helices of Corinthian Capital.

Helix, a genus of gasteropodous molluscs, comprising the land shell-snails. The common garden snail (*H. hortensis*) and the edible snail of France (*H. pomatia*) are examples.

Hell (A. Saxon, *hel*, from *helan*, to cover), signifies originally the covered or invisible place. In the English Bible the word is used to translate the Hebrew *sheol* (grave or pit) and *Gehenna* (properly the valley of *Hinnom*), as well as the Greek *Hades* (the unseen). In the Revised Version of the New Testament, however, hell is used only to translate *Gehenna*, *Hades* being left where it stands in the Greek. In common usage hell signifies the place of punishment of the wicked after death, its earlier meaning being lost. The distinctive Scripture term for the place of future punishment of the wicked is Gehenna, which, unlike Sheol and Hades, never has an intermediate signification; and Christ adopting on this point the current language of the time gave the sanction of his authority to the leading ideas involved in it. Gehenna, or hell, is with him the place of final torment. The Eastern and Western churches are at one as to the punishment of hell being partly 'a pain of loss,' that is, the consciousness of being debarred the presence of God, and partly a 'pain

of sense,' that is, real physical suffering. The prevailing idea among modern theologians is that the 'fire' and the 'worm' are significant emblems to give us the most correct and living conceptions of the reality that we can possibly attain in our present circumstances.

Helladotherium (hel-a-do-ther'i-um), an extinct genus of ungulate quadrupeds allied to the existing giraffe. Fossil remains occur in the upper Miocene rocks of Attica.

Hellas, HELLENES. See *Greece.*

Hellbender, a popular name for the Menopome (which see).

Hellebore (hel'e-bōr; *Hellebŏrus*), a genus of plants, nat. order Ranunculaceæ, consisting of perennial low-growing plants with palmate or pedate leathery leaves, yellowish, greenish, or white flowers, having five conspicuous persistent sepals, eight to ten small tubular petals, and several many-seeded carpels. *H. orientālis* is the species which produced the black hellebore of the ancients. *H. niger*, the Christmas-rose common in gardens, is a native of South and East Europe, and is the source of the black hellebore of modern pharmacopeias. The whole of these plants are accounted purgative, and in large doses act as a narcotic acrid poison; but they are now little used in medicine. *Veratrum album*, order Melanthaceæ, a very different plant, is known as white hellebore. It is extremely acrid, and in the form of powder is used to destroy caterpillars.

Black Hellebore or Christmas-rose (*Hellebŏrus niger*).

Hellen (hel'en), in Greek mythology, son of Deucalion and Pyrrha, and founder by his three sons Dorus, Æolus, and Xuthus of the great branches of the Greek people or Hellenes.

Hellenists (hel'en-ists), a name for those Jews who, especially in Egypt after the time of Alexander the Great, became imbued with Greek culture and civilization, and spoke and wrote in Greek. To them was due the formation of the peculiar dialect termed the *Hellenistic* dialect of Greek, the special feature of which was its use of foreign, and more particularly of Hebrew and Aramaic words and idioms. The most noted of the Jewish Hellenistic philosophers was Philo of Alexandria, and the chief of the learned labors of the Alexandrian Jews was the Septuagint version of the Old Testament.

Hellespont. See *Dardanelles.*

Hellevoetsluis (hel'vut-sloys), a fortified seaport of the Netherlands, prov. of South Holland, 18 miles southwest of Rotterdam, on the Haringvliet, the largest mouth of the Rhine. William III embarked here for England in 168. Pop. 4299.

Hell Gate, a formerly dangerous pass in East River, the strait which connects New York Bay with Long Island Sound. Rocks here used to form an obstruction much dreaded by mariners, but by extensive submarine mining operations and the use of the most powerful explosives, the passage has been practically cleared.

Helm, the contrivance by which a vessel is steered, usually composed of three parts, viz., the rudder, the tiller, and the wheel, except in small vessels, where the wheel is unnecessary. See *Steering Apparatus.*

Helmet (hel'met), an article of armor for the protection of the head, composed of leather or of metals. Some of Homer's heroes are represented as wearing brazen helmets, with towering crests. Among the Romans the *cassis* was a metallic helmet; the *galea*, a leathern one. The earlier Greek and Roman helmets did not protect the face. During the middle ages helmets were made of steel, frequently inlaid with gold, and provided with bars and flaps to cover the face in battle and to allow of being opened at other times. The full-barred helmet entirely covered the head, face, and neck, having in front

Full-Barred Helmet. Open Helmet.

perforations for the admission of air, and slits through which the wearer might see the objects around him. The open helmet covered only the head, ears, and neck, leaving the face unguarded. Some open helmets had a bar or bars from the forehead to the chin, to guard against

the transverse cut of a broadsword. The modern military helmets afford no protection for the face. Firemen wear a heavy head-piece of leather and brass, or other materials, to protect them so far as possible from falling ruins at conflagrations. Helmets of white felt, with folds of linen wrapped round them, are worn in India and other hot climates as a protection against the sun. The name helmet is also given to a kind of hat worn by policemen. In *heraldry* the helmet is borne over a coat of arms, and the form and position of it vary according to the quality or dignity of the bearer. See *Heraldry*.

Helmet-shell, the common name of molluscous shells of the genus *Cassis*, gasteropods of the family Buccinidæ. Most of the species are inhabitants of tropical shores, but a few are found on the coast of the Mediterranean. Some of the shells attain a large size. Those of *C. rufa*, *C. cornuta*, *C. tuberosa*, and other species, are the material on which shell cameos are usually sculptured.

Helmholtz (helm'holts), HERMANN-LUDWIG FERDINAND, a German physiologist and physicist, born in 1821 at Potsdam, and educated at Berlin. In 1848 he became professor of anatomy at the Academy of Fine Arts, Berlin, and in 1849 he obtained the chair of physiology at Königsberg, from which he was successively transferred to the same post at Bonn (1855), and at Heidelberg (1858). In 1871 he was appointed professor of physics at Berlin. His work has been chiefly in those departments of physics which are in closest relation with physiology, notably in acoustics and optics. Of his many publications the best known are: *The Conservation of Force* (1847), *Manual of Optics* (1856-66), *Popular Lectures on Scientific Subjects* (London, 1873 and 1881), and *Sensations of Tone as a Physiological Basis for the History of Music* (1862, London 1875). He was ennobled by the German emperor in 1883. He died in 1894.

Helmont (hel'mont), JOHN BAPTIST VAN, born in 1577 at Brussels; in his seventeenth year gave public lectures on surgery at Louvain. Perceiving the defects of the system of Galen, he announced his intention of reforming medicine, but finally renounced its practice, and traveled for ten years. He was then induced by an empirical chemist to take up the study of chemistry, and his medical tastes reviving, he retired to Vilvorde, near Brussels, where he occupied himself till his death with medical labors. He boasted of having found the means of prolonging life, composed visionary theories on the constitution of man, and on diseases, and made some genuine discoveries in chemistry. He was probably the first to introduce the term *gas* into science, and was also first to observe the acid reaction of the gastric juice. The system of Van Helmont resembles that of Paracelsus, but is more clear and scientific. The emperors Rodolph II, Matthias, and Ferdinand II, invited him to Vienna, but he preferred the independence of his laboratory. He died in 1644, and his manuscripts were printed by Elzevir.

Helmstedt, or HELMSTADT (helmstet), a town in Brunswick, 20 miles E. S. E. of Brunswick; formerly a member of the Hanseatic League. There are a fine church of the twelfth century and buildings in the Romanesque style formerly accommodating a university abolished in 1809. Pop. 14,259.

Helmund (hel'mund), a river in Afghanistan, which it traverses diagonally northeast to southwest, and ultimately falls into the extensive Lake Hamoon, after a course of about 550 miles. Its source is 11,500 feet above sea-level.

Heloderma (hel-u-dėr'ma), a Mexican genus of lizards, of which one species at least, *H. horridum*, has been proved to be venomous, all its teeth being furnished with poison glands. It is about 3 ft. in length, has a thick and squat body covered with rough scales, forms burrows under the roots of trees, is nocturnal in habit, and is said to feed on insects, worms, millepeds, etc.

Héloise, ELOISE (ē-lo-ēz), celebrated for her beauty and wit, but still more on account of her love for Abelard; was born in Paris in 1101. After the mutilation of her lover she was persuaded by him to take the veil at Argenteuil, and ultimately became prioress of the convent there until 1129, when she entered, with some of her nuns, the oratory of the Paraclete, built by Abelard at Nogent-on-the-Seine, where she lived in exemplary piety. She died in 1164. Contemporary writers speak in high terms of her genius. She understood Latin, Greek, Hebrew, was familiar with the ancients, and well read in philosophy and theology.

Helots (hel'otz), slaves in ancient Sparta. They were the property of the state, which alone had the disposal of their life and freedom, and which assigned them to certain citizens, by whom they were employed in private labors. Agriculture and all mechanical

arts at Sparta were in their hands, and they were also obliged to bear arms for the state in case of necessity. They behaved with great bravery in the Peloponnesian war, and were rewarded with liberty (431 B.C.), but 2000 appear to have been subsequently secretly massacred. They several times rose against their masters, but were always and finally reduced.

Helper (hel'pėr), HINTON ROWAN, author, born in Davie County, North Carolina, in 1829. He lived for a time in California and wrote *The Land of Gold.* He won great notoriety by his *The Impending Crisis of the South* (1857), an antislavery work which created a great sensation. Other works were *No-joque* and *Negroes in Negroland.* He was United States consul at Buenos Ayres, 1861-67, and died by suicide in 1909.

Helps, SIR ARTHUR, an English essayist and historian, born in 1817. He was graduated at Cambridge in 1835, and from 1859 until his death in 1875 was clerk of the privy-council. His works, which are for the most part of a pleasant moralizing type, with many indications of a fine, if not of a robust personality, comprise *Thoughts in the Cloister and the Crowd* (1835); *Catherine Douglas, a Tragedy* (1839); *Essays written during the Intervals of Business* (1841); *The Spanish Conquest of America* (1855-61); *Realmah, a Romance* (1868); *Ivan de Brion, a Russian Story* (1874), and various others. He also edited the Prince Consort's *Speeches* (1862), and the Queen's *Leaves from a Journal* (1868), receiving knighthood shortly before his death.

Helsingborg (hel-sing-bor'), a seaport in Sweden, at the narrowest part of the Sound, opposite Elsinore. It has manufactures of leather, dye-works, tile-works, salt-works, and a spacious harbor. Pop. 24,670.

Helsingfors (hel-sing-fors'), a seaport of Russia, capital of Finland, on a peninsula in the gulf of that name, 180 miles W. N. W. St. Petersburg. Helsingfors is the residence of the governor, the seat of important courts and public offices, and contains a university, removed from Abo in 1827. It has manufactures of linen, sail-cloth, and tobacco, an important trade in timber, corn, and fish, and one of the best harbors in the Baltic. Pop. 111,654.

Helsingör. See *Elsinore.*

Helst, BARTHOLOMEW VAN DER, a most distinguished Dutch portrait painter, born at Haarlem in 1611 or 1612. His picture of a banquet of a company of civic guard in the Stadthouse at Amsterdam was called by Sir Joshua Reynolds 'perhaps the first picture of portraits in the world.' He died at Amsterdam (where he had long resided) in 1670.

Helston (hel'stun), a borough of England, county of Cornwall, on an acclivity on the left bank of the Cober, 9 miles S. W. Falmouth. Principal industries, mining and shoemaking, and there is some shipping trade from Port Leven, 3 miles distant. Pop. 2938.

Helvellyn (hel-vel'lin), one of the highest mountains of England, county of Cumberland, between Keswick and Ambleside; height, 3313 feet.

Helvetian Republic (hel-vē'shun) the name given to the republic established in Switzerland by the French in 1798. See *Switzerland.*

Helvetic Confession (hel-vet'ik), the name of a document drawn up by Martin Bucer in 1536 to settle the controversy between the Lutherans and the Zwinglians; and also of one drawn up by Bullinger (1566) at the request of Friedrich III, elector of the Palatinate, and adopted in Switzerland, the Palatinate, France, Hungary, Poland, and Scotland.

Helvetii (hel-vē'shi), anciently a Gallic or Celtic nation, dwelling in the country now nearly corresponding with Switzerland. They were not much known to the Romans until the time of Julius Cæsar, who, as governor of Gaul, prevented their intended emigration, and after many bloody battles pressed them back within their frontiers. After their subjection by Cæsar several Roman colonies were established amongst them. On the death of Nero the Helvetii, for refusing to acknowledge Vitellius as emperor, were mercilessly punished by Cæcina, one of his generals, and thenceforth almost disappear as a people. From them Switzerland is often called Helvetia.

Helvétius (el-vā-si-ŭs), CLAUDE ADRIEN, a French philosophical writer, born in 1715. Having made a fortune as a farmer-general, he devoted himself to philosophic work. In 1758 he published his one important book, *De l'Esprit* ('On the Mind'), the materialism of which drew upon him many attacks. It was condemned by the Sorbonne, and publicly burned by decree of the Parliament of Paris. In 1764 he went to England, and the year afterwards to Germany, where Frederick the Great and

other German princes received him with many proofs of esteem. He died in 1771 in Paris. He also wrote a work, *De l'Homme*, and an allegorical poem, *Le Bonheur*.

Helvoetsluis (hel'vut-slois). See *Hellevoetsluis*.

Hemans (hem'anz), Felicia Dorothea, an English poetess, born at Liverpool in 1794; maiden name Brown. She first appeared as an authoress in 1808, with a volume entitled *Early Blossoms*, which was followed in 1812 by her more successful volume, *The Domestic Affections*. Later works were, *Lays of Many Lands*, *Songs of the Affections*, *Hymns for Childhood*, *National Lyrics*, etc. She died in 1835.

Hematin (hem'a-tin), or Hæmatin, the red coloring matter of the blood occurring in solution in the interior of the blood corpuscles or cells. It is the only structure of the body, except hair, which contains iron.

Hematite (hem'a-tīt), a name applied to two ores of iron, red hematite and brown hematite. They are both of a fibrous structure, and the fibers, though sometimes nearly parallel, usually diverge or even radiate from a center. They rarely occur amorphous, but almost always in concretions, reniform, globular, botryoidal, stalactitic, etc. The red hematite is a variety of the red oxide, and is one of the most important iron-ores. The brown hematite is a variety of the brown oxide or hydrate; its streak and powder are always of a brownish yellow. See *Iron*.

Hematoxylin. See *Hæmatoxylin*.

Hemeralopia (hem-er-a-lō'pi-a), a defect in the sight in consequence of which a person can see only by artificial light; day blindness. It is also used, however, for exactly the opposite defect of vision.

Hemerobiidæ (hem-er-o-bi'dē), the lace-wing flies, a family of neuropterous insects.

Hemerocallis (hem-er-o-kal'is), a genus of Liliaceæ. See *Day-lily*.

Hemidesmus (hem-i-des'mus), a genus of twining plants, nat. order Asclepiadaceæ, having opposite leaves, and cymes of small greenish flowers. *H. indicus* yields the Indian sarsaparilla, a reputed alterative, diuretic, and tonic, which is rarely employed in England.

Hemimetabola (-me-ta-bō'la), the section of the class Insecta which undergo an incomplete metamorphosis, the larva differing from the perfect insect chiefly in the absence of wings and in size.

Hemiopia (-ō'pi-a), a defect of vision in which the patient sees only a part of the object he looks at, the middle of it, its circumference, or its upper or lower part, or more commonly one lateral half being completely obscured. Also called *hemianopsia*.

Hemiplegia (-plē'gi-a), Hemiplegy, a paralysis affecting one-half of the body.

Hemipodius (-pō'di-us), a genus of rasorial birds allied to the quails. The swift-flying hemipodius is the little quail of New South Wales.

Hemiptera (he-mip'tėr-a), an order of four-winged insects, having a suctorial proboscis, the outer wings, or wing-covers, either entirely formed of a substance intermediate between the elytra of beetles and the ordinary membranous wings of most insects, or leathery at the base and transparent towards the tips (*hemelytra*). In one group (Aphides) all the wings when present are membranous. The true wings are straight and unplaited. Some feed on vegetable and some on animal juices. Those having the upper wings of a uniform substance throughout (whether leathery or transparent) have been constituted into a section, and by some naturalists into an order named Homoptera; those having them partly leathery and partly transparent constitute the section or order Heteroptera. To the Hemiptera belong the plant-lice, boat-fly, cochineal insect, locust, bug, lantern-fly, etc.

Hemisphere (hem'is-fēr), half a sphere, especially one of the halves into which the earth may be supposed to be divided. It is common to speak of the Eastern Hemisphere and the Western Hemisphere, the former, also called the Old World, comprising Europe, Asia, Africa, Australia, etc.; the latter, North and South America, etc. The boundary between the two is quite arbitrary, and a more natural division of the earth is into the northern and the southern hemisphere, the equator forming the dividing line.

Hemlock, or Hemlock Spruce, a name given to an American fir (*Abies Canadensis*) from its branches resembling in tenuity and position the common hemlock. The bark contains tannin and is largely used as a substitute for oak-bark in tanning leather. It forms great part of the forests of Canada and of the northern United States, extending northward to Hudson Bay. Its timber is not much esteemed,

as it splits obliquely and decays rapidly in the atmosphere.

Hemlock (hem-lok), a poisonous plant, *Conium maculātum*, nat. order Umbelliferæ, supposed to be identical with the plant *kōneion* of the Greeks. It is a tall, erect, branching biennial, with a smooth, shining, hollow stem, usually marked with purplish spots, elegant, much divided leaves, which when bruised emit a nauseous odor, and white flowers in compound umbels of ten or more rays, surrounded by a general involucre of three to seven leaflets. It is found throughout Europe and temperate Asia and in the United States, in waste places, banks, and under walls. It is said to be fatal to cows when they eat it, but that horses, goats, and sheep may feed upon it without danger. In the human subject it causes paralysis, convulsions, and death. The poison administered to Socrates is supposed to have been a decoction of it, though others are of opinion that the potion was obtained from water-hemlock (*Cicūta virōsa*). Hemlock is a powerful sedative, and is used medicinally. The alkaloid, coniine, is considered the best preparation. It is often serviceable as a substitute for, or an accompaniment to, opium.

Hemlock (*Conium maculatum*).

Hemorrhage (hem'u-rij), a flux of blood from the vessels containing it, whether from a rupture or any other cause. A hemorrhage from the lungs is called *hemoptysis;* from the urinary organs, *hematuria;* from the stomach, *hematemesis;* from the nose, *epistaxis;* the treatment of course varying with the cause and seat of the mischief.

Hemorrhoids (hem'u-roidz), signifying an affection of the rectum otherwise called *piles*. In general, hemorrhoids manifest themselves between the period of puberty and old age, although infants and aged people are not entirely exempt from attacks. In some cases they appear to be the effect of a certain hereditary disposition, but any circumstance which produces a tendency or stagnation of the blood at the extremity of the rectum is to be reckoned among the local causes. The accumulation of fecal matter in the intestines, efforts to expel urine, the obstruction of any of the viscera, especially of the liver, the frequent use of hot bathing, of drastic purges, long continuance in a sitting posture, riding on horseback, pregnancy—such are some of the ordinary causes of hemorrhoids. They are classified in several varieties as external, when apparent at the anus; internal, when concealed within the orifice; blind or open, regular or irregular, active or passive, periodical or anomalous, etc. The best mode of treatment is to recur to hygienic rather than medicinal influences. The subject should avoid violent exercise; the food should not be too stimulating or nutritious. Traveling, or an active life, should succeed to sedentary habits. Constipation should be remedied by laxatives or gentle purgatives. Anything which may be productive of a local heat should be avoided; as warm seats, soft beds, too much sleep. If the pain is considerable recourse should be had to sedatives, gentle bleeding, leeches. The use of suppositories containing drugs, such as tannic acid or extract of witch-hazel (hazeline), will be found very useful; in mild cases iodoform suppositories may be curative. If the disease appears under a more severe form a surgical operation may become necessary.

Hemp (*Cannăbis satīva*), a plant, the only known species of the genus *Cannăbis*, nat. order Cannabinaceæ. It is an annual herbaceous plant; the leaves are divided into five lanceolate and coarsely serrate leaflets; the male flowers, which are on separate stems, are green, resembling those of the hop; the female flowers are inconspicuous, and the fruit is a little hard capsule containing a single seed. It is a native of Western and Central Asia, but has long been naturalized in Brazil and tropical Africa, and is extensively cultivated in Italy and many other European countries, particularly Russia and Poland. The Indian variety, often known as *Cannăbis Indica*, is the source of the narcotic drug variously known as *hashish*, *bhang*, or *gunjah*. The hemp fiber is tough and strong, and peculiarly adapted for weaving into coarse fabrics such as sailcloth, and for twisting into ropes and cables. Immense quantities are exported from Russia. The finer sorts are used for shirtings, sheetings, etc., which, though coarser than that made from flax, are very

Hemp (*Cannăbis satīva*).

much stronger and equally susceptible of being bleached. The hemp of England is very superior, but the plant does not pay the farmer, and very little of it is grown. In some of the United States it is a crop of considerable importance. The seed must be sown thin, not more than 1 to 2 bushels to an acre. Small paths are often left open along the field lengthwise, at about 7 feet distance from each other, to allow the plucking of the male plants first, as the female require to remain standing a month longer to admit of the seed becoming ripe. But in some parts the whole crop is cut at once, plants for seed being separately cultivated. The plant being stripped of its leaves, and dried in the open air, may be stored, but when steeped green it turns out of a better color. The steeping takes from four to eleven days, and the operation is known to be completed by the inner *reed* or woody fiber separating easily from the fibers of the outer bark. When thoroughly steeped it is taken out of the water and spread out in rows on the grass to bleach. This takes three weeks or more, during which period it requires constant turning with a light, long pole. After drying it is scutched or broken by breaks and scutching-stocks, resembling those employed for flax. Beating is the next operation, which separates the 'boon' from the fiber. The hemp is now ready for being heckled, after which it may be spun. Hemp-seed is much used as food for cage-birds, and also yields an oil. Sisal hemp or (henequen) and Manila hemp are not true hemps.

Hemp, AFRICAN. See *Bowstring Hemp.*

Hemp-agrimony. See *Eupatorium.*

Hemp-nettle, the English name for Galeopsis (which see).

Hemp-palm, a Chinese and Japanese species of palm (*Chamærops excelsa*), of the fibers of whose leaves cordage is made, while hats and even cloaks are made from the leaves themselves.

Hems, or HOMS (Roman, *Emesa*), a town of Syria, 85 to 90 miles northeast of Damascus. It is fortified, and has an active trade. The plains of Hems were the scene of the defeat of Zenobia by Aurelian in 272 A. D.; and of the defeat of the forces of the Sultan of Turkey by Ibrahim Pasha in 1832. Pop. estimated 35,000 to 60,000.

Henbane (hen'bān), a plant of the genus *Hyoscyămus*, nat. order Solanaceæ. *H. niger*, a native of Europe and Northern Asia, is a coarse, erect biennial herb, found in waste ground and loose dry soil, having soft, clammy, hairy foliage of disagreeable odor, pale yellowish-brown flowers streaked with purple veins, and a five-toothed calyx. The expressed juice of the leaves and seeds is often used as a sedative, antispasmodic, and narcotic, having in many cases the great advantage over laudanum of not producing constipation. When taken in considerable quantity it proves quickly fatal to man and most animals, particularly to domestic fowls, whence the name.

Henbane (*Hyoscyămus niger*).

Henderson, a city, capital of Henderson county, Kentucky, on the Ohio River, 10 miles below Evansville, Indiana. It has tobacco factories, cotton and woolen mills, etc., and is in a tobacco and coal-mining region. Pop. 11,452.

Hendricks, THOMAS A., Vice-President of the United States, was born in Muskingum County, Ohio, in 1819. He studied law and practiced in Indiana, serving from 1851 to 1869 in the Indiana Legislature and in both Houses of Congress. As United States Senator he was pronounced in favor of the Union. In 1872 was elected governor of Indiana. In 1876 and 1884 was a candidate for the Vice-Presidency. He lost the election in the former year through the decision of the Electoral Commission, but was elected with Grover Cleveland in the latter year. He died in 1885.

Heney, FRANCIS JOSEPH, lawyer, born at Lima, New York, in 1859. He graduated at the University of California and the Hastings Law School, was admitted to the bar in 1883, engaged in legal and other occupations in Arizona, and was attorney-general of Arizona, 1893-94. He removed to San Francisco in 1895, and was later chosen by Attorney-General Knox to conduct cases of fraudulent land dealings at Portland, Oregon. In these he secured the removal from office of United States Attorney John H. Hall for conspiracy, and the conviction for fraud of United States Senator Mitchell, George C. Brownell, and others. He served for a time as United States District Attorney for Oregon, and in 1906

began an investigation of the wholesale corruption then existing in San Francisco. He succeeded in proving great bribery and graft, in which a party leader named Reuf and Mayor Eugene Schmidt were deeply involved. He secured their conviction, Reuf being sentenced to 14 years, Mayor Schmidt to 5 years' imprisonment. During these trials Heney was shot by a saloonkeeper, but soon recovered and continued his cases. He was defeated in a contest for the district attorney election in 1909.

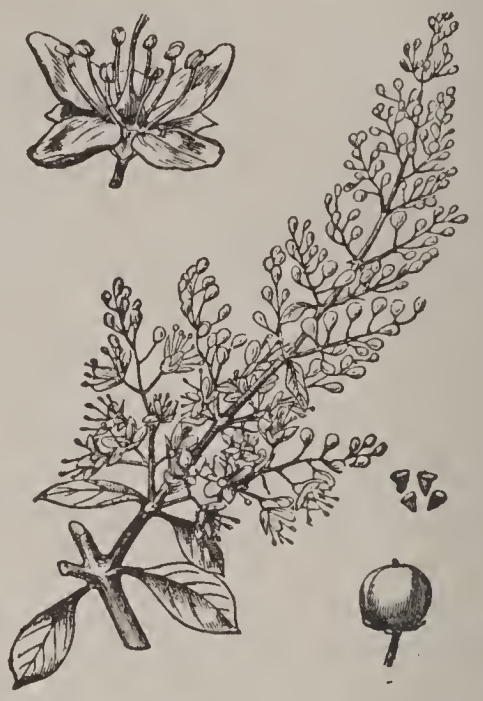
Hengist (hen'jist), a prince of the Jutes, founder of the Kingdom of Kent in Great Britain, in conjunction with his brother Horsa. In 449 the Britons sued for aid from the Saxons against the inroads of the Scots and Picts. The Saxons under Hengist and Horsa accordingly landed at the mouth of the Thames, and defeated the northern tribes near Stamford in 450 A.D. Being reinforced from home they afterwards united with the Scots and Picts against the Britons, whom they ultimately dispossessed. Hengist, who had lost his brother in the battle near Eglesford (now Ailsford) in 445 A.D., founded the Kingdom of Kent, established his residence in Canterbury, and died about the year 488. By some recent writers the brothers are, with insufficient reason, regarded as mythical personages.

Hengstenberg (h e n g ' s t e n-burg), Ernst Wilhelm, a German divine and commentator, born in 1802, and long professor of Old Testament exegesis at the University of Berlin. He died in 1869. His influence as leader of the orthodox party was established by the publication of the *Evangelische Kirchenzeitung* (1827); of which he was editor, and which had for contributors Otto and Ludwig von Gerlach, Neander, Tholuck, Lange, Huber, Stahl, Vilmar, and Leo. His works include a translation of Aristotle's *Metaphysics; Christology of the Old Testament*, and *Introduction to the Old Testament; Commentary on the Psalms, the Revelation of St. John; History of the Kingdom of God in the Old Testament*, etc.

Hen-harrier, a species of hawk of the genus *Circus, C. cyaneus*. See *Harrier*.

Henley-on-Thames, a municipal borough of England, in Oxfordshire, on the left bank of the Thames, here crossed by a handsome bridge, 35 miles west of London. Pop. 6456.

Henna (hen'a), a shrub (*Lawsonia inermis*), nat. order Lythraceæ, bearing opposite entire leaves and numerous small white fragrant flowers disposed in terminal panicles. Externally it bears considerable resemblance to the European privet. It grows in moist situations throughout North Africa, Arabia, Persia, and the East Indies, and has acquired



Henna Plant (*Lawsonia inermis*).

celebrity from being used by the inhabitants of those countries to dye yellow the nails of their fingers and the manes, hoofs, etc., of their horses.

Henry I, of Germany, surnamed *The Fowler*, according to tradition because his election to the German empire was announced to him while fowling; born in 876; the son of Otho the Illustrious, duke of Saxony. Henry, on the death of his father, became duke of Saxony and Thuringia. He was elected emperor of Germany in 919, and was the true founder of the empire. By his prudence and activity Suabia and Bavaria were forced to tender allegiance, and Lorraine was reunited to the German Empire in 925. He was defeated, however, by the Hungarians, and forced to pay a yearly tribute to obtain a truce for nine years. He spent this period in developing a sound military organization, and turning his arms against various Slavonic tribes in the south, was everywhere victorious. At the end of the truce with the Hungarians he refused the tribute, and completely routed them in 933. Besides his military reforms he diminished the feudal privileges, and granted to the cities of the empire their first municipal charters. He died in 936.

Henry II, the Saint, Emperor of Germany, born in 972, was a son of Henry the Quarreler of Ba-

varia, and great-grandson of the Emperor Henry I. He inherited Bavaria in 995, and on the death of Otho III in 1002 laid claim and was elected to the empire. He had to proceed to Italy to assert his sovereignty there, the Lombard cities having chosen Harduin of Ivrea as their king. During his absence Boleslas of Poland extended his sway over the whole of Bohemia, but after repeated campaigns Henry succeeded in recovering Bohemia, and in 1018, in the Peace of Budissin (Bautzen), reduced him to complete subjection. In the midst of these campaigns against Boleslas he made another expedition into Italy (1013) against Harduin. On this occasion Henry was crowned emperor by Pope Benedict VIII. He made a third expedition into Italy in 1022 to aid Benedict against the Greeks. He died in 1024.

Henry III, Emperor of Germany, the second belonging to the house of the Salian Franks, son of the Emperor Conrad II, was born in 1017; chosen king in 1026; succeeded his father in the imperial dignity, in 1039. He weakened the power of the great feudal lords and forced the duke of Bohemia in 1042, and the king of Hungary in 1044, and again in 1047, to accept their dominions as imperial fiefs. His influence was also paramount in Italy, especially in Milan, and in the south, where the Normans in Apulia and Calabria paid him homage. In 1046 he deposed the rival popes Benedict IX, Sylvester III, and Gregory IV, and caused Suitger, bishop of Bamberg, to be elected in their stead as Clement II. His efforts to secure the permanence of the influence of the empire over the see of Rome were thwarted by Cardinal Hildebrand (Gregory VII). He died in 1055. His first wife was a daughter of Canute the Great of England.

Henry IV, Emperor of Germany, son of Henry III, was born in 1050, and at the death of his father was only five years old. His whole life was a series of troubles, partly of his own causing. His severe treatment of the Saxons led to a rising which was cruelly punished. His treatment of the conquered people was such that they complained to the pope, and Gregory VII (Hildebrand) accordingly summoned Henry, in 1076, to appear before him at Rome and answer the charges, at the same time forbidding the sale of ecclesiastical dignities. Henry not only disregarded the threat, but instigated the bishops, assembled by his order at Worms, to renounce their obedience to the pope. Gregory, however, pronounced sentence of excommunication against him, and Henry, finding himself deserted, was obliged to go to Italy and make a humiliating submission to the pope (1077). The influence which the pope gained by his victory produced a reaction; the Italian princes who had long been dissatisfied with Gregory, offered Henry their assistance. The German princes, however, at the instigation of the pope, elected Rudolph, duke of Suabia, king. Henry hastened back to Germany and overcame his rival, who lost his life in 1080. Gregory again excommunicated Henry; but at the Council of Brixen, in 1080, he was deposed by the German and Italian bishops as a heretic and a sorcerer, and Guibert, archbishop of Ravenna (Clement III) set up in his place. In 1084 Henry succeeded in establishing Clement at Rome, but was obliged to return to Germany to maintain his obliged to cross the Alps in aid of his ground against two rivals who successively arose. In 1085 Henry was again protégé Clement III. But the dissatisfaction against him in Germany had not subsided, and though he succeeded in crushing the rebellion of his eldest son, Conrad, who died deserted at Florence in 1101, his second son Henry made himself master of his father's person in 1105 by stratagem, and compelled him to abdicate the throne at Ingelheim. Henry IV ended his life and his sorrows in neglect at Liége in 1106.

Henry V, Emperor of Germany, the son and successor of Henry IV (see above), was born in 1081. On his ascension the question of investiture distracted the empire anew. Pope Pascal would confer the imperial crown only upon condition that the rights claimed by Gregory should be formally conceded. Henry therefore seized the pope at the altar, and imprisoned him until he yielded two months later, and crowned Henry in April, 1118. Disturbances, however, arose in Germany, especially with Lothaire of Saxony, and the pope, declaring that his peace with the emperor had been compulsory, fomented the strife. The war continued two years, and devastated Germany, and after a second expedition to Italy and excommunication by successive popes. Henry was compelled to yield in the matter of investiture, and in 1122 subscribed the Concordat of Worms. He died at Utrecht in 1125, and was the last of the Salic or Frankish family of emperors, which was succeeded by the Suabian house. He married Matilda, a daughter of Henry I of England.

Henry VI, Emperor of Germany, son of Frederick I and Beatrice of Burgundy, the third emperor of the house of Hohenstaufen, born in

1165, crowned king in 1169, succeeded his father as emperor in 1190. He kept Richard Cœur du Lion in prison, and obtained a large ransom for him. He died in 1197.

Henry VII, Emperor of Germany, born in 1262, was chosen emperor in 1308. Among the first acts of his reign were recognition of the independence of the Swiss cantons of Schwyz, Uri, and Unterwalden, and the granting of the kingdom of Bohemia to his son John. He compelled the Milanese to give him the iron crown of Lombardy, suppressed by force the revolt which then broke out in Upper Italy, captured part of Rome, which was in the hands of Neapolitan troops, and was crowned Roman Emperor by two cardinals. He died suddenly in 1313.

Henry II, King of France, born in 1519, succeeded his father, Francis I, in 1547. Throughout his reign his mistress, Diana of Poitiers, exercised an important influence over king and court. After a brief war with England for the recovery of Boulogne, a war of longer duration and more serious results originated in 1551 in disputes between Henry and the pope as to the duchies of Parma and Placentia, and continued to devastate Europe till the general peace of Câteau-Cambrésis, 1559. To confirm the peace Philip II, become a widower by the death of Mary of England, was to marry Elizabeth, Henry's eldest daughter by Catharine de Medici. In the course of a tourney held to celebrate the event, Henry was mortally wounded by a splinter from the lance of Lord Montgomery, captain of the Scottish guard. He was succeeded in 1559 by his eldest son, Francis II.

Henry III, King of France, third son of Henry II and Catharine de Medici, born in 1551; succeeded his brother, Charles IX, in 1574. In the previous year he had been chosen king of Poland, which he was obliged to quit secretly when called to the throne of France. In 1576, after a civil war, he granted to the Protestants the favorable edict of Beaulieu, but the concession led to the formation of the League, and Henry, to re-establish his authority, declared himself its head. Civil war, however, again broke out, and though hostilities were again put an end to by the Peace of Bergerac in 1577, they were renewed in 1580 until the Peace of Fleix (November, 1580). The death of his brother the Duc d'Anjou in 1584, which left Henry of Navarre, a Calvinist, heir-apparent to the throne, brought on another war, called the war of the Three Henries, the leading persons engaged in it besides the king being Henry of Guise, the real head of the League, and Henry of Navarre. In 1588 Henry of Guise expelled the king from his capi' l. An apparent reconciliation at Blois was followed by the assassination of the Guises, and Henry, finding himself everywhere opposed by the Catholic party, was compelled to ally himself with Henry of Navarre. The two princes advanced on Paris, but in 1589 Henry III was stabbed by Jacques Clement, a Dominican, and died next day. He was the last of the branch of Orléans-Angoulême of the stock of the Valois, and was succeeded by Henry of Navarre, the first of the house of Bourbon.

Henry IV, of France was the son of Anthony of Bourbon, Duke of Vendôme, and of Jeanne d'Albert, daughter of Henry, King of Navarre, and herself afterwards Queen of Navarre. He was born in December, 1553, at Pau. Educated by his mother in the Calvinistic faith, he early joined, at her wish, the Protestant army of France, and served under Admiral Coligny. In 1572 he married Margaret of Valois, sister of Charles IX, and after the massacre of St. Bartholomew, which took place during the marriage festivities, was forced to adopt the Catholic creed. In 1576 he escaped from Paris, retracted at Tours his enforced abjuration of Calvinism, put himself at the head of the Huguenots, and took a leading part in all the subsequent religious wars. On becoming presumptive heir to the crown in 1584 he was obliged to resort to arms to assert his claims. In 1587 he defeated the army of the League at Coutras, and after the death of Henry III gained the battles of Arques (1589) and Ivri (1590). He was obliged, however, to raise the siege of Paris; and convinced that a peaceful occupation of the throne was impossible without his professing the Catholic faith, he became nominally a Catholic in 1593. After his formal coronation in 1594 only three provinces held out against him—Burgundy, reduced by the victory of Fontaine-Française in 1595; Picardy, reduced by the capture of Amiens in 1596; and Brittany, which came into his hands by the submission of the Duke of Mercœur in the spring of 1598. The war against Spain was concluded in 1598 by t' Peace of Vervins to the advantage of France. The same year was signallized by the granting of the edict of Nantes, which secured to the Protestants entire religious liberty. He made use of the tranquillity which followed to restore the internal prosperity of his kingdom, and particularly the wasted finances, in which he was successful with the aid

of his prime-minister Sully. At the instance of Sully Henry divorced Margaret of Valois, and in 1600 married Marie de Medici, niece of the Grand-duke of Tuscany, mother of Louis XIII. She was crowned at St. Denis in 1610, but on the following day Henry was stabbed by a fanatic named Ravaillac, while examining the preparations for the queen's entry into Paris. The great benefits which Henry IV bestowed upon France entitle him to the designation which he himself assumed at an assembly of the Notables at Rouen in 1596, the Regenerator of France (*Restaurateur de la France*).

Henry I, King of England, surnamed *Beauclerc* ('fine scholar'), youngest son of William the Conqueror, was born at Selby in Yorkshire, in 1068. He was hunting with William Rufus when that prince was killed, in 1100, and instantly riding to London, caused himself to be proclaimed king, to the prejudice of his elder brother Robert, then absent as a Crusader. He re-established by charter the laws of Edward the Confessor, recalled Anselm to the primacy, and married Matilda, daughter of Malcolm III of Scotland, thus conciliating in turn the people, the church, and the Scots. Robert landed an army, but was pacified with a pension, and the promise of succession in event of his brother's decease. Soon after, however, Henry invaded Normandy, took Robert prisoner in 1106, and reduced the duchy. He was successful also in the struggle with France. The last years of his reign were very troubled. In 1120 his only son William was drowned in returning from Normandy, where, three years later, a revolt occurred in favor of Robert's son. The Welsh also were a source of disturbance. Henry appointed as his heir his daughter Matilda or Maud, whom he had married first to the Emperor Henry V, and then to Geoffrey Plantagenet of Anjou. Henry died at Rouen in 1135, and was succeeded by Stephen.

Henry II, King of England, first of the Plantagenet line, born in Normandy in 1133, was son of Geoffrey, count of Anjou, and Matilda, daughter of Henry I. He was invested with the duchy of Normandy, by the consent of his mother, in 1150; in 1151 he succeeded to Anjou and Maine, and by a marriage with Eleanor of Guienne gained Guienne and Poitou. In 1152 he invaded England, but a compromise was effected, by which Stephen was to retain the crown, and Henry to succeed at his death, which took place in 1154. The commencement of his reign was marked by the dismissal of the foreign mercenaries; and although involved with his brother Geoffrey, who attempted to seize Anjou and Maine, and in a temporary dispute with France, he reigned prosperously till the contest with Thomas Becket regarding the Constitutions of Clarendon. Although sufficiently submissive after Becket's death in the way of penance and expiation, Henry gave up only the article in the Constitutions of Clarendon which forbade appeals to the court of Rome in ecclesiastical cases. Before this matter was terminated, Henry, in 1171, completed the conquest of Ireland, a great part of which had been reduced by Richard de Clare, Earl of Pembroke, commonly known as Strongbow. Henry's last years were embittered by his sons, to whom he had assigned various territories. The eldest son, Henry, who had been not only declared heir to England, Normandy, Anjou, Maine, and Touraine, but actually crowned in his father's lifetime, was induced by the French monarch to demand of his father the immediate resignation either of the kingdom of England or of the dukedom of Normandy. Queen Eleanor excited her other sons, Richard and Geoffrey, to make similar claims; Louis and William of Scotland gave them support; and a general invasion of Henry's dominions was begun in 1173 by an attack on the frontiers of Normandy, and an invasion of England by the Scots, attended by considerable disturbance in England. Conciliating the church by his penance, Henry took prompt action; William of Scotland was captured, and an accommodation arrived at with Henry's sons. These, however, once more became turbulent, and though the deaths of Henry and Geoffrey reduced the number of centers of disturbance, the king was forced to accept humiliating terms from Richard and Philip of France. He died shortly after at Chinon in 1189. He ranks among the greatest English kings both in soldiership and statecraft. He partitioned England into four judiciary districts, and ap-

Henry II, from his tomb.

pointed itinerant justices to make regular excursions through them; revived trial by jury, discouraged that by combat, and demolished all the newly erected castles as 'dens of thieves.'

Henry III, King of England, son of John by Isabel of Angoulême; born at Winchester in 1207; succeeded his father in 1216. At the time of his accession the dauphin of France, Louis, at the head of a foreign army, supported by a faction of English nobles, had assumed the reins of government; but was compelled to quit the country by the Earl of Pembroke, who was guardian of the young king until 1219. As Henry approached manhood he displayed a character wholly unfit for his station. He discarded his most able minister Hubert de Burgh, and after 1230, when he received homage in Poitou and Gascony, began to bestow his chief favors upon foreigners. His marriage in 1236 with Eleanor of Provence, increased the dislike to him felt by his subjects, and although he received frequent grants of money from parliament, on condition of confirming the Great Charter, yet his conduct after each ratification was as arbitrary as before. At length the nobles rose in rebellion under Simon de Montfort, earl of Leicester and husband of the king's sister; and in 1258, at a parliament held at Oxford, known in history as the Mad Parliament, obliged the king to sign the body of resolutions known as the Provisions of Oxford. A feud arose, however between Montfort and Gloucester, and Henry recovered some of his power. War again broke out, and Louis was called in as arbitrator, but his award being favorable to the king, Leicester refused to submit to it. A battle was fought near Lewes, in which Henry was taken prisoner. A convention, called *the Mise of Lewes*, provided for the future settlement of the kingdom; and in 1265 the first genuine House of Commons was summoned. Leicester, however, was defeated and slain in the battle of Evesham (1265), and Henry was replaced upon the throne. He died in 1272. His son Edward I succeeded him.

Henry IV, King of England, first king of the house of Lancaster; born in 1366; was eldest son of John of Gaunt, duke of Lancaster, third son of Henry III by the heiress of Edmund, earl of Lancaster, second son of Henry III. In the reign of Richard II he was made earl of Derby and duke of Hereford, but having in 1398 preferred a charge of treason against Mowbray, duke of Norfolk, he was banished with his adversary. On the death of John of Gaunt in 1399 Richard withheld Henry's inheritance, and Henry, landing in England, gained possession of Richard's person. The deposition of Richard by parliament, and the election of Henry, was followed by the murder of the late king. A plot against the king in 1400 was discovered in time to prevent its success, and many executions of men of rank followed; but an insurrection in Wales under Owen Glendower proved more formidable. The Scots were decisively defeated by the Percies at Homildon, and their leader, the Earl of Douglas, was captured (1402). An order from Henry not to permit the ransom of that nobleman and other Scottish prisoners was regarded as an indignity by the Percies, who set Douglas free, made an alliance with him, and joined Glendower. The king met the insurgents at Shrewsbury (1403), the battle ending in the defeat and death of Percy. The Earl of Northumberland was pardoned, and but few victims were executed. A new insurrection, headed by the Earl of Nottingham and Scrope or Scroop, archbishop of York, broke out in 1405, but was suppressed by the king's third son, Prince John. The rest of this king's reign was comparatively untroubled. In 1405 James, son and heir to King Robert of Scotland, was captured at sea on his way to France, and was detained a prisoner in England. Henry died in 1413, and was succeeded by Henry V.

Henry V, King of England, born at Monmouth in 1388. On succeeding his father, Henry IV, in 1413, he showed a wisdom in marked contrast to a somewhat reckless youth. He restored their estates to the Percies, and liberated the Earl of March, but in other respects based his internal administration upon that of his father. The persecution of the Lollards is the chief blot upon the early part of his reign. The struggle in France between the factions of the dukes of Orleans and Burgundy afforded Henry a tempting opportunity for reviving the claims of his predecessors to the French crown. He accordingly landed near Harfleur in August, 1415, and though its capture cost him more than half his army he decided to return to England by way of Calais. A large French army endeavored to intercept him at the plain of Agincourt, but was completely routed (October, 1415). A year later the French were defeated at sea by the Duke of Bedford. In 1417 the liberal grants of the Commons enabled Henry once more to invade Normandy with 25,000 men. The assassination of the Duke of Burgundy, which induced his son and successor to join Henry,

greatly added to his power, and the alliance was soon followed by the famous Treaty of Troyes (May 21, 1420), by which Henry engaged to marry the Princess Catharine, and to leave Charles VI in possession of the crown, on condition that it should go to Henry and his heirs at his decease. He returned in triumph to England, but on the defeat of his brother, the Duke of Clarence, in Normandy by the Earl of Buchan, he again set out for France, drove back the army of the dauphin, and entered Paris. A son was at this time born to him, and all his great projects seemed about to be realized when he died of fever at Vincennes in August, 1422, at the age of thirty-four, and in the tenth year of his reign. He was succeeded by his son Henry VI.

Henry VI, King of England, born at Windsor in 1421, was crowned at Westminster in 1429, at Paris in 1430. As he was an infant not nine months old at the death of his father Henry V, his uncle John, duke of Bedford, was appointed regent of France; and his uncle Humphrey, duke of Gloucester, made protector of the realm of England. A few weeks after Henry's succession Charles VI of France died, when, in accordance with the Treaty of Troyes, Henry was proclaimed king of France. The war which followed at first proved favorable to the English, but in the end, by the heroism of Joan of Arc, the death of the Duke of Bedford, and the defection of the Duke of Burgundy, resulted in the loss to the English of all their possessions in France except Calais. In April, 1445, Henry married Margaret of Anjou, daughter of René of Provence. Two years later Humphrey of Gloucester died, when the Earl of Suffolk acquired the chief power in the kingdom, but his government was very unpopular. The insurrection of Cade followed, and the Duke of York returning from Ireland, a great party was formed in his favor, and he was declared by Parliament protector of the kingdom, the imbecile Henry being by this time unable even to personate majesty. The appointment was annulled in the following year, the king having recovered his faculties. York retired to the north, and being joined by his adherents, marched upon London. He encountered and defeated the king's army at St. Albans (1455), the first battle of the thirty years' wars of the Roses. The king again becoming deranged, York was once more made protector. Four years of peace followed, but the struggle was soon renewed. The king's forces were beaten at Blore Heath and Northampton, and though they gained the Battle of Wakefield, at which York was killed, they were again defeated by his son Edward at Towton and Hexham. Henry was restored for a few months in 1471 by Warwick, 'the king-maker,' but the battles of Barnet and Tewkesbury proved the hopelessness of his cause, and he died, some say was murdered, a few days after the last battle, in May, 1471. He was a gentle, pious, well-intentioned, hopelessly incompetent king, whose best reputation is that of founder of Eton College and King's College, Cambridge.

Henry VII, King of England, first sovereign of the race of Tudor, born in 1456. He was the son of Edmund, earl of Richmond, son of Owen Tudor and Catharine of France, widow of Henry V. His mother, Margaret, was the only child of John, duke of Somerset, grandson of John of Gaunt. After the battle of Tewkesbury he was carried by his uncle, the Earl of Pembroke, to Brittany, and on the usurpation of Richard III was naturally turned to as the representative of the house of Lancaster. In 1485 he assembled a small body of troops in Brittany, and having landed at Milford Haven, defeated Richard at Bosworth, and was proclaimed king on the field of battle, his right being subsequently recognized by parliament. In 1486 he married Elizabeth, daughter of Edward IV and heiress of the house of York, and thus united the claims of the rival houses of York and Lancaster. The reign of Henry VII was troubled by repeated insurrections, of which the chief were that headed by Lord Lovel and the Staffords (1486), and the impostures of Lambert Simnel (1487) and Perkin Warbeck (1496-99). He brought about a match between the Infanta Catharine, daughter of Ferdinand of Aragon and of Isabella of Castile, and his eldest son Arthur; and on the death of the latter, in order to retain the dowry of this princess, he caused his remaining son Henry to marry the widow by papal dispensation, an event which, in the sequel, led to a separation from the see of Rome. He married his eldest daughter to James IV, king of Scotland, from which marriage there ultimately resulted the union of the two crowns. In his later years his avarice became increasingly marked, two exchequer judges, Empson and Dudley, being employed in all sorts of extortion and chicanery in order to gratify this passion. His reign, however, was in the main beneficent. Its freedom from wars permitted the development of the internal resources of the country. His policy of depressing the feudal nobility, which proportionably exalted the middle ranks, was highly salutary. For a time,

however, the power lost by the aristocracy gave an undue preponderance to that of the crown. Henry died at Richmond in 1509.

Henry VIII, King of England, son of the preceding, born in 1491, succeeded his father in 1509. He was soon prevailed upon to join in a league formed against Louis XII of France. Some campaigns in France followed, but the success of the English at the Battle of the Spurs (1513) was succeeded by no adequate result, the taking of Tournay being the only fruit of this expensive expedition. Meantime, more splendid success attended the English arms at home, James IV of Scotland being completely defeated and slain at Flodden Field (1513). Henry, however, granted peace to the Queen of Scotland, his sister, and established an influence which rendered his kingdom long secure on that side. Finding himself deluded by his allies, he soon after made peace with France, retaining Tournay and receiving a large sum of money. From 1515 until 1529 the government was practically in the hands of Wolsey, no parliament being summoned in that period until 1523. After the election of Charles V to the German Empire, both Charles and the French king, Francis I, sought the alliance of England. A friendly meeting took place between Henry and Francis at the Field of the Cloth of Gold (1520), but the interest of Charles preponderated, and Henry declared war against France, though with no important results. Now came the determination of the king to divorce his wife Catharine, who was older than he, had borne him no male heir, and had, moreover, been in the first place the wife of his elder brother. The last of these points was the alleged ground for seeking divorce, though Henry was probably influenced largely by his attachment to Anne Boleyn, one of the queen's maids of honor. Wolsey, for his own ends, had at first been active in promoting the divorce, but drew back and procrastinated when it became apparent that Anne Boleyn would be Catharine's successor. This delay cost Wolsey his power and the papacy its authority in England. Henry in disgust eagerly caught at the advice of Thomas Cranmer, afterwards Archbishop of Canterbury, to refer the case to the universities, from which he soon got the decision that he desired. In 1533 his marriage with Catharine was declared null and an anticipatory private marriage with Anne Boleyn declared lawful; and as these decisions were not recognized by the pope, two Acts of Parliament were obtained, one in 1534 setting aside the authority of the chief pontiff in England, the other in 1535 declaring Henry the supreme head of the church. But although Henry discarded the authority of the Roman Church, he adhered to its theological tenets; and while, on the one hand, he executed Bishop Fisher and Sir Thomas More for refusing the oath of supremacy, he brought many of the reformers to the stake. Finding that the monks and friars in England were the most direct advocates of the papal authority, and a constant source of disaffection, he suppressed the monasteries by act of parliament, and thereby inflicted an incurable wound upon the Catholic religion in England. The fall of Anne Boleyn was, however, unfavorable for a time to the reformers. Henry then married Jane Seymour, and the birth of Prince Edward in 1537 fulfilled his wish for a male heir. The death of the queen was followed in 1540 by Henry's marriage with Anne of Cleves, the negotiations of which were conducted by Cromwell. The king's dislike to his wife, which resulted in another divorce, became extended to the minister who had proposed the union, and Cromwell's disgrace and death soon followed. A marriage with Catharine Howard in 1541 proved no happier, and in 1542 she was executed on a charge of infidelity. In 1543 he married his sixth wife, Catharine Parr, a lady secretly inclined to the Reformation, who survived the king. In the meantime Scotland and France had renewed their alliance, and England became again involved in war. James V ravaged the borders, but was defeated at Solway Moss in 1542, and in 1544 Boulogne was captured, Henry having again allied himself with Charles V. Charles, however, soon withdrew, and Henry maintained the war alone until 1546. Disease now so much aggravated the natural violence of Henry that his oldest friends fell victims to his tyranny. The Duke of Norfolk was committed to the Tower, and his son the Earl of Surrey was executed. Henry died on January 28, 1547, and was succeeded by his son, Edward VI.

Henry, Joseph, physicist, was born at Albany, New York, in 1799. In 1826 he began a series of brilliant experiments in electricity, and is said to have invented the first machine moved by the agency of electro-magnetism. In 1832 he was called to fill the chair of natural philosophy at Princeton. In 1846 he was elected secretary and director of the Smithsonian Institution. His published papers, chiefly on the subjects of electricity and magnetism, include over 150 titles. He died in 1878.

Henry, MATTHEW, a celebrated English divine, was born in 1662; died in 1714.

Henry of Huntingdon, an English historian, born about 1090; died about 1154.

Henry, PATRICK, orator, was born at Studley, Virginia, in 1736; died in 1799. Indolent in disposition, he tried several occupations unsuccessfully during youth, finally studying law and winning sudden distinction, in 1736, by his telling speech in a case against the clergy. His powers as an orator have never been surpassed. A remarkable speech made by him in 1765 in the House of Burgesses in Virginia led to active resistance to the Stamp Act, and its enforcement became impracticable. He was a delegate to the First Continental Congress, and in 1775 made his most famous speech before the Virginia Convention at Richmond. He was governor of Virginia 1776-79 and 1784-85, and in 1788 vigorously opposed the adoption of the Federal Constitution. He is looked upon as the most eloquent of Americans.

Henry the Lion, DUKE OF SAXONY, the most remarkable prince of Germany in the twelfth century, was born in 1129. He succeeded his father, Henry the Proud, in 1139, assuming the government of Saxony himself in 1146. At the diet of princes in Frankfort (1147) he demanded restitution of Bavaria, taken from his father by Conrad VII; but was worsted in the war which followed. It was restored to him, however, in 1154, after the death of Conrad, by the Emperor Frederick, Henry's cousin. His possessions then extended from the Baltic and the North Sea to the Adriatic, and he was successful in opposing the league formed against him at Merseburg in 1166. About two years afterwards he separated from his wife and married Matilda, daughter of Henry II of England. He then went on an expedition to the Holy Land, and during his absence his enemies, and even the emperor, made encroachments on his dominions. In 1174 he followed Frederick I on his fifth expedition to Italy, but left him at the siege of Alessandria. He was then put under the ban of the empire, and his dominions were given to other princes. Henry defended himself for a time successfully, but was at last obliged to take refuge in England. In 1182 he asked pardon of the emperor on his knees, and Frederick promised him his hereditary possessions. Brunswick and Lüneburg, on condition of his undergoing exile for three years. He therefore again went to England, but returned to Brunswick in 1184. In 1188 he was once more compelled to leave the country, and it was only in 1190, at the close of a year's fighting, that a reconciliation was finally effected. Henry died at Brunswick in 1195. He was much in advance of his age in fostering industry, science, commerce and the arts.

Henry the Navigator (*Don Henrique el Navegador*), fourth son of King John I of Portugal, born in 1394. In his youth he gave brilliant proofs of courage. When the Portuguese conquered Ceuta in 1415 Henry distinguished himself by his bravery, and was knighted by his father, after whose death he chose for his residence the city of Sagres, in Algarve, near Cape St. Vincent, and vigorously prosecuted the war against the Moors in Africa. He erected at Sagres an observatory and a school of navigation. From time to time he sent vessels on voyages to the coasts of Barbary and Guinea; resulting in the discovery of the islands of Puerto Santo and Madeira, and some years later of the Azores. In 1433 Gilianez, one of his navigators, safely doubled Cape Bojador, and other adventurers, pushing still further south, discovered Cape Blanco in 1441 and Cape Verd in 1445. A profitable commerce with the natives of West Africa was soon developed, and the Senegal and Gambia were partially explored. After acting as general against the Moors in 1458 Henry died at Sagres on the 13th of November, 1458. His efforts not only laid the foundations of the commerce and colonial possessions of Portugal, but gave a new direction to navigation and commercial enterprise.

Henryson (hen'ri-sun), ROBERT, a Scottish poet of the fifteenth century, born about 1425; died about 1506. He spent most of his life at Dunfermline, whe he was schoolmaster. The *Testament of Cresseid*, his most important work, is a continuation of Chaucer's *Troilus and Creseide*, though with individual merit; and he was probably the author of the early Scottish pastoral, *Robin and Makyne*. Amongst his other works were a *Tale of Orpheus*, *The Moral Fables of Æsop*, in Scottish meter, and an allegorical ballad, *The Bludy Serk*.

Henty (hen'ti), GEORGE ALFRED, an English writer, born near Cambridge in 1832; died in 1902. He served for a time as war correspondent for London papers, and afterwards wrote a number of novels and a large number (over seventy) of books of historical fiction for boys.

Hepar Sulphuris (lit. 'liver of sulphur,' so

called from its brownish-green and liver-like appearance), a mixture of polysulphides of potassium with sulphate or thiosulphate of potash.

Hepaticæ (he-pat'i-sē), or LIVERWORTS, ranunculaceous plants belonging to the genus anemone.

Hepatitis (he-pa-tī'tēs), a disease consisting in inflammation of some part of the liver.

Hephæstion (he-fēs'ti-on), a noble Macedonian of Pella, the friend of Alexander the Great. He accompanied the king in his Asiatic campaigns, and died at Ecbatana (B.C. 325 or 324). Alexander had his body conveyed to Babylon, and erected a monument to him, costing 10,000 talents.

Hephæstus (he-fēs'tus), a god of the ancient Greeks, identified by the Romans with their Vulcanus. He presided over fire, and was the patron of all artists who worked in iron and metals. He fixed his residence in Lemnos, where he built himself a palace, and raised forges to work metals. The Cyclopes of Sicily were his workmen and attendants; and with him they fabricated not only the thunderbolts of Zeus, but also arms for the gods and the most celebrated heroes. His forges were supposed to be under Mount Ætna. Aphrodītē (Venus) was the wife of Hephæstus.

Heppenheim (hep'en-hīm), an interesting old walled town of Germany in Hesse-Darmstadt, 16 miles south of Darmstadt. Pop. 6364.

Heptarchy (hep'tar-ki), the seven principal kingdoms into which England was divided in Anglo-Saxon times. The kingdoms were founded at different times, and at no one time were they all independent monarchies together. In 827 King Egbert of Wessex united the other kingdoms into one, and assumed the title of king of England. See *England.*

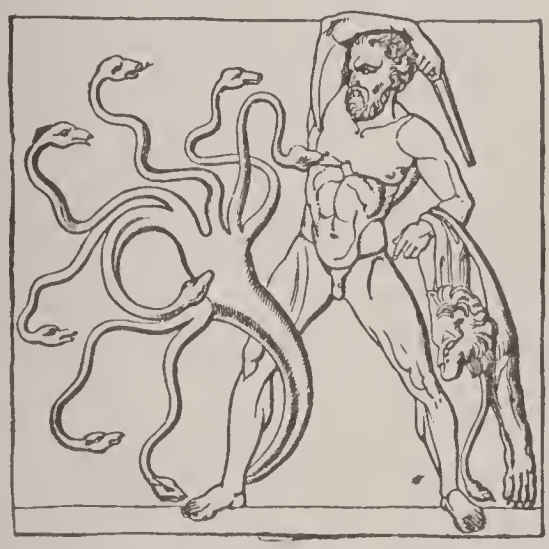
Heptateuch (hep'ta-tuk), a name sometimes given to the five books of Moses or Pentateuch, together with the books of Joshua and Judges.

Hera (hē'ra), an ancient Greek goddess, identified by the Romans with their Juno, the sister and wife of Zeus (Jupiter), and daughter of Kronos (Saturn) and Rhea. The poets represent Zeus as an unfaithful husband, and Hera as an obstinate and jealous wife, the result of which is frequent strife between them. She was worshipped in all Greece, but her principal seats were at Argos and at Samos. The companions of Hera were the Nymphs, Graces, and Hours. Iris was her particular servant. Among animals, the peacock, the goose, and the cuckoo were sacred to her. Her usual attribute is a royal diadem on her head. The festivals in her honor were called Heræa. The principals were those celebrated every fifth year at Argos, which city was considered to be especially under her protection.

Hera.—Antique statue

Heracles (her'a-klēs), called by the Romans *Hercules*, the most celebrated hero or semi-divine personage of Greek mythology, was the son of Zeus (Jupiter) by Alcmena, the wife of Amphitryon. He was brought up at Thebes, and before he had completed his eighth month strangled two snakes sent by the jealous Hera (Juno) to devour him. In youth he had several distinguished instructors, among them the Centaur Cheiron. Early in life he had, at the command of Zeus, to subject himself for twelve years to the will of Eurystheus, on the understanding that after he had acquitted himself of this duty he should be reckoned in the number of the gods. He therefore went to Mycenæ, and performed at the bidding of Eurystheus the tasks known as the *twelve labors of Heracles.* These were: (1) to kill a lion which ravaged the country near Mycenæ; (2) to destroy the Lernæan hydra; (3) to capture, alive and unhurt, a stag famous for its incredible swiftness, its golden horns, and brazen feet; (4) to capture alive a wild boar which ravaged the neighborhood of Erymanthus; (5) to clean the stables of Augeas, where 3000 oxen had been confined for many years; (6) to kill the birds which ravaged the country near the lake Stymphalus, in Arcadia, and ate human flesh; (7) to bring alive into Peloponnesus a prodigious wild bull, which laid waste the Island of Crete; (8) to obtain the mares of Diomedes, which fed upon human flesh; (9) to obtain from the queen of the Amazons a girdle which she had received from Ares (Mars); (10) to kill the monster Geryon, king of Gades, and bring to Argos his numerous flocks, which fed upon human flesh; (11) to obtain apples from the garden of the Hesperides; (12) the last and

most dangerous of all, to bring from the infernal regions the three-headed dog Cerberus. Besides these labors, he also achieved of his own accord others equally celebrated. Thus, he assisted the gods in their wars against the giants, and it was through him alone that Zeus obtained the victory. Having attempted to plunder the temple at Delphi, he became engaged in conflict with Apollo, and was punished by being sold to Omphălē, queen of Lydia, as a slave, who restored him to liberty and married him. Having later returned to Greece, he became the husband of De-



Hercules slaying the Hydra.—From sculpture at Florence.

janira, who unwittingly brought about his death by giving him a tunic poisoned with the blood of the Centaur Nessus, which she innocently believed would retain for her Heracles' love. The poison took effect whenever the garment was put on, and as the distemper was incurable, Heracles placed himself on a burning pile on the top of Mount Œta, was received up into heaven, and being there reconciled to Hera, received her daughter Hebe in marriage. In ancient works of art Heracles is generally represented naked, with strong and well-proportioned limbs; he is sometimes covered with the skin of the Nemæan lion, and holds a knotted club in his hand, on which he often leans. The principal ancient statue of him which remains is the *Farnese Hercules* at Rome, a work of the Athenian Glycon. The myth of Heracles is believed by many writers to represent the course of the sun through the twelve signs of the zodiac. His marriage with Hebe was explained even by the ancients as symbolic of the renewing of the sun's course after its completion.

Heracleum (her-a-klē'um), a genus of large umbelliferous herbs, the cow-parsnips, of which *H. Sphondylium* (common cow-parsnip or hog-weed) is very common in Britain in damp meadow ground and pastures. *H. giganteum* (the Siberian cow-parsnip) is often grown in shrubberies, reaching the height of 10 feet.

Heraclidæ (her-a-klī'dē), the descendants of Heracles, but more particularly those who, assisted by the Dorians, successfully asserted by arms their claim to the Peloponnesus, whence their ancestors had been driven by usurpers. See *Greece* (*History*).

Heraclitus (her-a-klī'tus), a Greek philosopher, born at Ephesus, who flourished about 513 B. C. He traveled in different countries, particularly in Africa. On his return to Ephesus he was offered the chief magistracy, but refused it. He is said to have latterly repaired to solitary mountains to live on roots and herbs; but, being attacked by a fatal disease, was obliged to return to the city, where he died soon afterwards, it is said in his sixtieth year. He left a work on Nature, in which he treats also of religion and politics. Some fragments only of this work remain. He is considered as belonging generally to the Ionic school of philosophers, though he differed from it in important particulars. He considered fire as the first principle of all things, describing it as an ethereal substance, 'self-kindled and self-extinguished,' from which the world is evolved (not made) by a natural operation. It is also a rational principle, and the source of the human soul. Phenomena exist in a constant state of flux, always tending to assume new forms, and finally returning again to their source.

Heraclius (her-a-klī'us), Roman emperor of the East, born in Cappadocia about 575 A. D.; the son of Heraclius, exarch of Africa. At the head of a fleet from Carthage, in 610, he assisted in dethroning Phocas, the murderer and successor of the Emperor Mauritius, and himself ascended the throne. In a succession of splendid victories he crushed the Persians under Chosroes; but the energy of his earlier years seems to have worn itself out, and he made no effort to check the victorious progress of Mohammed. Before his death Syria, Palestine, Mesopotamia, and Egypt had fallen under the dominion of the caliphs. He died in 641, and was succeeded by his son, Constantine III.

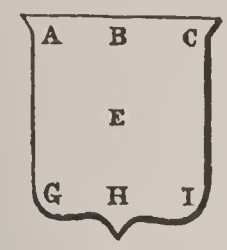
Herald (her'ald), an officer whose functions originally were to carry messages of courtesy or defiance between sovereigns or persons of knightly rank, to superintend and register the results of trial by battle, tournaments, and

other chivalric exercises, to record the valiant deeds of combatants, proclaim war or peace, marshal processions and public ceremonials, and especially, in later times, to regulate and determine all matters connected with the use of armorial bearings. Heralds began to appear about the twelfth century, and assumed the functions which ultimately belonged to their office gradually. The herald, after the office was fully constituted, was created with many ceremonies, and had to pass through various grades of protracted service before reaching the full dignity of a herald. The office is now shorn of much of its importance. Heralds are appointed in England by the earl marshal, whose office is hereditary. The Heralds' College, or College of Arms, founded by charter of Richard III in 1483, consists of the three chief heralds (see *Garter King-of-Arms*), the six subordinate or provincial heralds of York, Lancaster, Chester, Windsor, Richmond, and Somerset; two heralds appointed on the accession of George I, called Hanover herald and Gloucester king-of-arms, together with the earl marshal and secretary, in all thirteen persons. There are four marshals or pursuivants, called blue-mantle, rouge-croix, rouge-dragon, and portcullis, who usually succeed to vacancies in the Heralds' College. Among the duties of the Heralds' College are the recording of pedigrees and the granting of coats of arms to persons who wish to assume them. The Heralds' College, or Lyon Court, in Scotland, consists of Lyon king-of-arms, and six heralds, with six pursuivants.

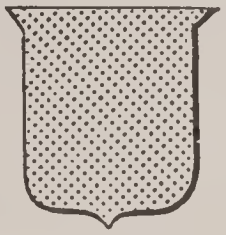
Herald-crab, a species of crab (*Huenia heraldica*), the carapace of which presents a fanciful resemblance to the shield and mantle figured by heraldic painters in depicting coat-armor.

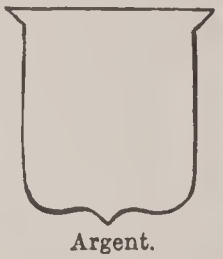
Heraldry (her'ald-ri), the whole science of a herald's duties, or more commonly the knowledge of the forms, terms, and laws which pertain to the use of armorial bearings or coats of arms. Badges and emblems on shields, helms, banners, etc., naturally occurred in the earliest times, and the symbols were sometimes hereditary. The origin of heraldic arms, properly so called, is, however, to be attributed to the necessity which arose during the Crusades of distinguishing the leaders of the numerous and motley bands of warriors which constituted the Christian armies. One of the oldest specimens of heraldic bearings extant is the shield at Mans of Geoffrey Plantagenet, who died in 1150. Rolls of arms in England are extant from the reigns of Henry III, Edward I, and Edward II. The use of arms on the Great Seal of England was introduced by Richard I. The bearing of coat-armor by private persons was prohibited by proclamation in the reign of Henry V. The chief courts of jurisdiction in questions of heraldry are the Heralds' College in England, and the Lyon Court in Scotland. (See *Herald.*) The rules of heraldry now practised at the Heralds' College are comparatively modern, and differ in some respects from those of other European courts. A coat of arms consists of the figure of a shield marked and colored in a vast variety of ways, so as to be distinctive of an individual, a family, or a community. The shield or *escutcheon* represents the original shield used in war, and on which arms were anciently borne. The surface of the escutcheon is termed the *field*, and the several parts or *points* of it have particular names, so that the figures which the field contains may be precisely located. Color is given in the coat of arms by means of *tinctures*, two of which are *metals—or* and *argent*, that is, gold and silver—the rest *colors* proper. These colors are, in heraldic terminology: *azure*, blue; *gules*, red; *sable*, black; *vert*, green; *purpure*, purple; *tenney*, orange; *sanguine*, blood-color. The last two are comparatively uncommon. An object represented in its natural colors is said to be *proper*. When not given in colors or by actual gilding the tinctures are represented by points and lines in black and white. *Or* is distinguished by small dots covering the part; *argent* is represented by leaving the space blank; *azure* is shown by horizontal lines; *gules*, by perpendicular lines; *sable*, by perpendicular and horizontal lines crossing each other; *vert*, by diagonal lines running from the dexter chief to the sinister base; *purpure*, by diagonal lines running from the *sinister* chief to the *dexter* base. Another class of tinctures are the *furs*, of which the two principal are *ermine* and *vair*, and which have also their special method of representation. The figures borne on the shield may be either purely artificial and conventional, or may represent real objects, animals, plants, etc. Of the former the most common are known as *ordinaries*, and have the following names: Chief, Pale, Bend, Fesse, Bar, Chevron, Cross, and Saltire. The *chief* is a portion of the shield at the top marked off by a horizontal line, and covers the upper third part of the field. The *pale* occupies the middle third part of the field perpendicularly. The *bend* is drawn diagonally from the dexter chief to the sinis-

Heraldry

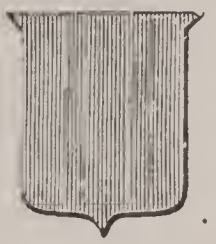


Points of the Shield.

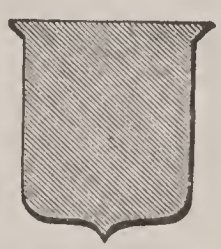

Or.

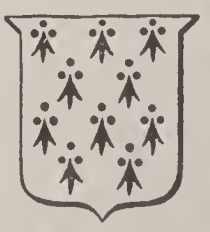

Argent.

Azure.


Gules.

Sable.


Vert.

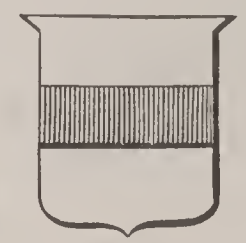

Ermine.

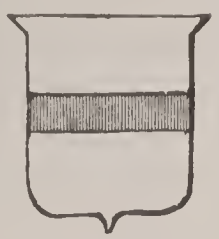
Vair.

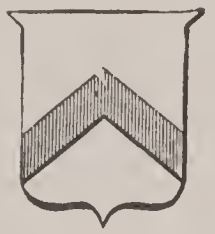
Chief.

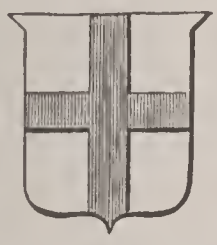
Pale.

Bend.

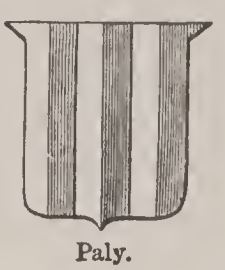

Fesse.


Bar.


Chevron.


Cross.

Saltire.


Paly.

Bendlet.

Party per pale.

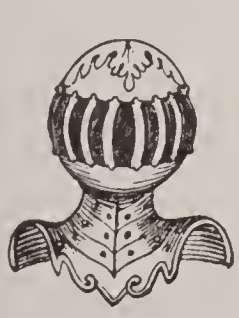
Rampant.

Trippant.

Volant.

Naiant.

Displayed.


King.

Noble.

Knight.

Esquire.

ter base in the form of a belt, and also occupies the third of the field. A diminutive of the bend is the *bendlet*. The *fesse* occupies the middle third of the field horizontally. The *bar* is formed after the manner of a fesse, but occupies only a fifth of the field, and is not confined to any particular part of it, except when there is only one bar, when it is put in the place of a fesse. Bars are mostly two in a field, sometimes three or more. A diminutive is the *barrulet*. The *chevron* may be regarded as made of a bend dexter and sinister issuing from the right and left base points of the escutcheon and meeting like two rafters. The *cross* is the ordinary cross of St. George. The *saltire* is the equally well-known cross of St. Andrew. The shield is often divided by lines running similarly to the ordinaries; hence when divided by a perpendicular line it is said to be *party per pale*, when by a horizontal line *party per fesse*, when by a diagonal line *party per bend*. Similarly, when it seems to bear several pales or bends or bars, it is said to be *paly*, *bendy*, or *barry* of so many pieces, 'paly of six argent and gules' for instance. *Charges* are the figures of natural and artificial things, and include animals and plants, implements and objects of all sorts, and various imaginary monsters, being drawn either on the field or on one of the ordinaries. It is a rule in heraldry that metal must not be put on metal nor color on color; hence, if the field say is *argent*, it cannot have a charge or an ordinary tinctured *or* directly upon it. Various technical terms describe the position of animals; thus, a lion is *rampant* when he is erect standing on one of his hind legs; *sejant*, when sitting; *couchant*, when lying at rest, with the head erect; *passant*, in a walking position; *gardant*, looking full-faced; *rampant gardant*, erect and looking full-faced; *salient*, in a leaping posture. So *trippant* is said of the stag when trotting; *lodged*, of the stag when at rest on the ground; *volant*, of birds in general in a flying posture; *rising*, of a bird that is preparing to fly; *displayed*, of birds seen frontwise with outspread wings; *naiant*, of fishes when swimming; and so on. The teeth and claws of lions and other ravenous beasts are called their *arms;* and when these have a special tincture the animal is said to be *armed* of such a tincture; similarly if their tongue be of a special tincture, they are said to be *langued* of this tincture. Often two or more coats of arms are united together on one shield, so that the whole may be a very complicated affair. The art of arranging arms in this way is known as *marshaling*, and when the shield is divided up into squares for the reception of different coats, it is said to be *quartered*. There are also certain exterior ornaments of the shield or escutcheon, namely, the helmet, mantling, crest, wreath, motto, and supporters. The helmet, which is placed on the top of the escutcheon, varies both in form and materials. Those of sovereign princes are of gold, those of the nobility of silver, and those of gentlemen of polished steel. The *full-faced helmet*, with six bars, is for the king and princes of the blood; the *sidelong helmet*, with five bars, is for dukes and marquises, etc.; the *full-faced helmet of steel*, with its beaver or vizor open, is for knights; and the *sidelong helmet*, with the vizor shut, for the esquire. The mantling or mantle was anciently fixed to the helmet, to which it served as a covering. Mantlings are now used like cloaks, to cover the whole achievement. The crest is placed above the helmet, with the wreath serving as a kind of support; the latter is composed of two colors wreathed or twisted together. The motto consists of the word or phrase carried in a scroll under or above the arms. Supporters were originally only ancient devices or badges, which by custom came to embellish armorial ensigns. They are called *supporters* because they hold the shield, as the lion and the unicorn in the well-known royal arms of England. The present royal arms of Britain exhibit the arms of England, Scotland, and Ireland in the four quarters of the shield; that is: Quarterly, 1 and 4, England; 2, Scotland; 3, Ireland. The arms of England are: Gules, three lions passant gardant in pale or; Scotland, or, a lion rampant within a double tressure flory counter-flory gules; Ireland, azure, a harp or, stringed argent.

Heralds' College. See *Herald.*

Herat (her-ät'), a city in the northwest of Afghanistan, in a beautiful and fertile plain, about 370 miles west of Cabul. It is inclosed by a broad deep moat, and an earthen mound surmounted by a lofty wall of unburned brick, and defended by a strong citadel. From each of four of the five gates a long street of bazaars (one vaulted throughout its entire length) leads towards a square in the center of the town. The remaining streets are narrow and dirty. The most important manufactures are carpets, sword-blades, shoes, cloaks, and sheepskin caps. The trade, almost entirely in the hands of Hindus, is greatly favored by the situation of the town on the great thorough-

fare from India westward. Herat was long the capital of the empire founded by Tamerlane. Pop. about 45,000.

Hérault (ā-rō), a department of France, on the Mediterranean coast; area, 2393 square miles. In the northwest it is covered by the Cevennes, but it descends rapidly towards the coast, which is lined by lagoons. The chief rivers, the Hérault, Orb, and Lez, are partly navigable; but the most important water communication is the Canal du Midi. The arable land, about one-sixth of the whole, is generally fertile. The vine and mulberrry are extensively, the olive more partially cultivated; fruit is abundant; and aromatic, medicinal, and dye plants are largely grown. Salt is obtained in large quantities. Capital, Montpellier. Pop. 488,285.

Herbaceous Plants (her-bā'shus), perennial plants of which the stem perishes annually, while the roots remain permanent and send forth a new stem in the following season.

Herbarium (her-bā'ri-um), or Hortus Siccus, a collection of dried plants systematically arranged. The specimens should be collected in dry weather, and carried home in a japanned tin-box or vasculum, a small pocket-box being desirable, however, for mosses and small plants. Very delicate specimens should be at once placed in a small field-book of unsized blotting-paper carried tightly strapped between suitable boards. At home they are carefully arranged upon bibulous paper, and pressed between smoothly planed deal boards either by putting weights upon the boards or by using a screw-press. The paper is changed every day or two, as they are found to part with their moisture more or less freely. Succulent plants (such as stonecrops) should be killed by immersion in boiling water, and left for some time to drain, before pressing. If the stem be thick and woody, or if the flower be thick and globular, as in the thistle, one half may be cut away without depriving it of its character. When the process of desiccation has been completed specimens are fastened upon stiff paper (17 inches by 10½) with a mixture of gum-tragacanth and gum-arabic, or thin glue, or with slips of gummed paper, or a needle and thread. To preserve the specimens from the ravages of insects, camphor should be placed in the cabinet and frequently renewed, with occasionally a little corrosive sublimate.

Herb-bennet (that is, Saint Bennet or Benedict's herb), a plant, *Geum urbānum*, known also as *Avens*. It is aromatic, tonic, and astringent, and has been used in medicine, and as an ingredient in some ales.

Herb-Christopher, the bane-berry, *Actæa spicata*.

Herbert (her'bert), Edward, Lord Herbert of Cherbury, in Shropshire, an English writer, born in 1581, and educated at University College, Oxford. In 1609 he distinguished himself at the siege of Juliers under the Prince of Orange, and in 1614 served again in the Low Countries under the same leader. In 1618 he was sent ambassador to the court of France, but was recalled in consequence of a quarrel with Constable Luynes, the favorite of Louis XIII. On the death of Luynes, however, he was sent back to France as resident ambassador. At Paris, in 1624, he printed his famous book, *De Veritate*, with the object of asserting the sufficiency, universality, and perfection of natural religion. In 1625 he returned from France and was created an Irish peer, and in 1631 an English baron. He joined the parliamentary party, but subsequently quitted it, and suffered in fortune in consequence. He died in London in 1648. The character of Lord Herbert, as shown in his memoirs, was vain, punctilious, and quixotic, but open, generous, and brave. Another work of his was *De Religione Gentilium*. Soon after his death was published his *Life and Reign of Henry VIII*, and a collection of his poems was published in 1665.

Herbert, George, poet and divine, brother of Lord Herbert of Cherbury, born in 1593; was educated at Westminster and at Trinity College, Cambridge, of which he became a fellow in 1615. From 1619 till 1627 he was university orator. The death of James I in 1625 put an end to his prospects of civil promotion, and in the same year he took orders, and became a prebendary in the diocese of Lincoln. In 1630 he took priest's orders, and was presented to the rectory of Bemerton, near Salisbury, in Wiltshire. He died in 1633. His collection of religious poems, *The Temple*, was published in 1631, and the *Jacula Prudentum*, a collection of proverbs, in 1640. His poems bear the marks of an exceptionally fine nature, if not of genius, but they are marred by conceits and mannerisms. His chief prose work was *The Country Parson* (1652).

Herbert, Sidney, Lord Herbert of Lea, an English statesman, son of the eleventh Earl of Pembroke, was born in 1810. He was educated at Harrow and Oxford, and was Conservative member for South Wilts from 1832 till shortly before his death. He was secre-

tary to the admiralty under Peel in 1841, and in 1845 was made secretary for war, but became a convert to free-trade, and quitted office with Peel in 1846. In 1852 he became war secretary in the Aberdeen cabinet, and retained it till the dissolution of the ministry in 1855. For a short time he was colonial secretary under Palmerston, and in 1859 became once more secretary for war. Early in 1861 he was transferred to the House of Lords, but died in the same year.

Herb-gerard. See *Bishop-weed.*

Herb-robert, the *Geranium Robertianum*, called also *Stinking Crane's-bill*, common in dry places. It is astringent and aromatic, and has been used in nephritic disorders, but is now abandoned as a remedy.

Hercinite (hėr'sin-īt), a variety of the mineral called spinel.

Herculaneum (hėr-kū-lā'nē-um), an ancient city about 5 miles S. E. from Naples, completely buried with Pompeii, Stabiæ, etc., by lava and ashes during an eruption of Vesuvius in the reign of Titus, A. D. 79. The site had been long sought in vain, when in 1713 three statues were found in digging a well at the village of Portici. In 1738 the well was dug deeper, and traces of buildings were found. The theater was then discovered, but though the excavations were continued for many years it is now the only building to be seen underground, as the successive excavations were immediately filled up with rubbish from a new digging. A number of public buildings and private dwellings were laid bare, and many objects of great value discovered, such as statues, busts, beautiful mosaics, wall paintings, charred papyrus manuscripts, etc. One of the houses discovered contained a quantity of provisions, consisting of fruits, corn, oil, pease, lentils, pies, and hams. Few skeletons have been found either in Pompeii or Herculaneum, so that it is probable most of the inhabitants had time to save themselves by flight. Among the most interesting objects discovered here were the papyri, over 1750 of which are now in the Naples Museum, but hardly a third have yet been unrolled, the process presenting great difficulties from the tendency of the MSS. to crumble. The knowledge of ancient art has, however, gained more by the discoveries made here than literature. Recently a design of making a complete excavation of these ruins has been entertained, but as yet no work has been done.

Hercules (her'ku-lēs). See *Heracles.*

Hercules, one of Ptolemy's northern constellations, including 113 stars. The point to which the sun, with its accompanying system of planets, is traveling at present is situated in this constellation, which includes some remarkable star groups and nebulæ.

Hercules, Pillars of, the ancient name of the two promontories, Calpe (Gibraltar) and Abyla (Ceuta), at the entrance to the Mediterranean.

Hercules-beetle, a very large Brazilian lamellicorn beetle, *Scarabæus* or *Hynastes Hercules.* An enormous horn projects from the head, and a smaller one from the thorax, and the beetle attains a length of 5 inches.

Hercynian Forest (her-sin'i-an), the general name given by the ancients to the forest-clad mountains in Central Germany, extending from the Rhine to the Carpathians.

Herder (hėr'dėr), Johann Gottfried von, a German author, born in poor circumstances in 1744. He went in 1762 to Königsberg, procured an appointment in Frederick's College, and was permitted by Kant to hear all his lectures gratis. From 1764 to 1769 he was an assistant teacher at the cathedral school of Riga, with which office that of a preacher was connected, and it was during this period that he published his *Fragments on German Literature.* In 1769 he resigned his post in order to travel, and became traveling tutor to the Prince of Holstein-Oldenburg. But in Strasburg he was prevented from proceeding by a disease of the eyes; and here he became acquainted with Goethe, on whom he had a very decided influence. Besides his *Fragments*, his 'Critical Woods' (*Kritische Wälder*) and other productions had gained him a considerable reputation, and he was appointed in 1771 court preacher, superintendent, and consistorial counselor at Bückeburg, and in 1776 to the same offices at Weimar. In 1801 he was made president of the high consistory, a place before only given to noblemen. He was subsequently made a noble by the Elector of Bavaria. He died in 1803. As a theologian Herder contributed to a better understanding of the historical and antiquarian part of the Old Testament. His *Geist der Hebräischen Poesie* ('Spirit of Hebrew Poetry') is highly valued. He did much also for the better appreciation of the classical authors. His greatest work is his *Ideen zur Philosophie der Geschichte der Menschheit* ('Ideas on the Philosophy of the History of Man,' 1785 et seq.).

He also wrote some pleasing songs and translated the Spanish epic, *The Cid.*

Hereditaments (her-a-dit'a-ments), in law, any species of property that may descend to an heir. *Corporeal* hereditaments consist of material and tangible possessions, *incorporeal* hereditaments of rights and privileges not themselves tangible, though conferring claims on tangible possessions.

Hereditary Diseases. See *Disease.*

Heredity (hėr-ed'i-ti), the transmission from parent to offspring of physical and intellectual characters. This has been at all times believed in, but it is only in recent times that the conviction has, in the hands of Darwin, Herbert Spencer, and Wallace, been methodized so as to embody an important zoological doctrine. The modern view of evolution in biology rests upon the belief that acquired peculiarities, or differences which may arise between parent and offspring, can be transmitted with some probability of permanence, especially if the variation presented by the young is determined by external conditions, or if it is such as to adapt the possessor more thoroughly to the conditions under which it is placed. On the other hand, while variations may be thus permanently transmitted by heredity, yet this very tendency of the young to repeat the characters of the parent is also a check on variability, or the tendency of structure and attributes to change with the environment. It may be noted that while the strong tendency to hereditary transmission works in the majority of cases so as to perpetuate those most fitted to survive, it secures the same result in other cases by a converse action. The question of the heredity of acquired characters, changes arising during the lifetime of an individual, has of late years been vigorously debated, without any definite conclusion. It is strongly maintained by many zoologists that such characters cannot be transmitted to offspring, but their arguments and evidences are not sufficient to convince the many who hold the opposite view, and the problem is still an open one.

Hereford (he're-ford), a city and parliamentary borough of England, capital of a county of the same name, on the left bank of the Wye. The principal streets are broad and straight; houses mostly of brick, and the public buildings of stone. The beautiful cathedral near the Wye was rebuilt, in the reign of William the Conqueror, on the site of an earlier edifice, and restored in 1863 under the direction of Sir G. G. Scott. Other public buildings are the college adjoining the cathedral, the shire-hall, the county-jail, free library and museum, corn exchange, market-hall, and post-office. The manufactures, which are inconsiderable, consist of gloves, leather, turnery, nails, etc. Hereford was long an important garrison town on the Welsh border, and was the last city to surrender to the parliamentarians. Pop. 22,568.—The county, which is entirely inland, and borders on Wales, has an area of 833 sq. miles, nearly the whole of which is arable, meadow, and pasture. The county belongs wholly to the basin of Severn, towards which river it has a general slope north to south, as indicated by the course of its rivers, the Wye and its affluents. The soil is in general fertile. Wheat is the principal crop, but barley, oats, beans, pease, hops, and turnips are also extensively cultivated. Orchards are numerous, and a large quantity of excellent cider is made. The Herefordshire cattle are held in high estimation for meat, though not good milkers. Horses are bred in considerable numbers. Oak timber is abundant, and forms, with oak-bark, an article of export. Pop. (1911) 114,269.

Heretic (hėr'e-tik), one who embraces a heresy, that is, one who holds some theological doctrine which conflicts with the beliefs of the Catholic or universal church, but who, at the same time, calls himself a Christian. Many of the early Christians preserved their Jewish or Greek philosophical notions, and mingled them with the doctrines of Christianity. Even in the time of the apostles we find traces of the Gnostics, and subsequently a great variety of heretical sects or sectaries arose. Among the chief may be mentioned the Manichæans, Sabellians, Arians, Apollinarians, Nestorians, Monophysites, Pelagians, Monothelites, Paulicians, etc. Among religionists stigmatized as heretics in later times by the Roman Catholic Church, were the Waldenses, the Wicliffites, Hussites, Lutherans, and all Protestant sects and churches. Before Christianity was made the religion of the Roman state, nothing but excommunication was inflicted upon the heretic; but severe laws were passed soon after the conversion of the emperors. The code of Justinian contains many ordinances against heretics, and the canon law made it a duty to denounce them, under pain of excommunication. As early as 385 Priscillian was condemned to death as a heretic by the Spanish bishops at the Council of Trèves; but the persecutions of heretics, properly so called, began in the pontificate of Gregory VII, in

the eleventh century. Spain, Italy, and France, from the thirteenth to the sixteenth century, suffered much from these persecutions, but the states of Germany showed greater moderation. In England the burning of heretics was practiced before 1200, and long continued. Heresy is now left entirely to the cognizance of the ecclesiastical courts.

Herford (her'fort), a town of Prussia, in Westphalia, 16 miles southwest of Minden. It has manufactures of linen and cotton goods, leather, basket-work, and tobacco; oil mills, etc. Pop. (1905) 24,821.

Heriot (her'i-ot), in old English law, a tribute or fine, as the best beast or other chattel, payable to the lord of the fee on the decease of the owner, landholder, or vassal.

Heriot, GEORGE, founder of the hospital in Edinburgh which bears his name, and jeweler to King James VI, was born in 1563. He followed his father's profession, and was admitted a member of the Incorporation of Goldsmiths in 1588. In 1597 he was appointed goldsmith to the queen by James VI, and on the accession of the latter to the English crown followed the court to England. He died in 1624. He left nearly the whole of his fortune to found a hospital in Edinburgh for the maintenance and education of poor fatherless boys, freemen's sons, of the town. The present magnificent structure known as Heriot's Hospital was built between 1628 and 1659. See *Edinburgh*.

Herisau (hā'rē-zou), a town of Switzerland, in the canton and 4 miles northwest of Appenzell. It has manufactures of muslin and other kinds of cotton goods. Pop. 13,501.

Heristal. See *Herstal*.

Herkimer, a village, capital of Herkimer County, New York. It is on the Mohawk River, 14 miles S. E. of Utica. It has paper, knitting, and furniture mills, and cheese is largely made in the vicinity. Pop. 7520.

Herkimer, NICHOLAS, soldier, born in New York about 1715, commanded at Fort Herkimer, New York, when attacked by Indians in 1758, and in 1777 led a militia force to relieve Fort Stanwix, then besieged by British and Indians. In an engagement at Oriskany he was mortally wounded.

Hermann (hėr'mȧn), JOHANN GOTTFRIED JAKOB, a German scholar, born in 1772. He began to lecture on ancient literature at Leipzig in 1794, and with this university he was connected till his death in 1848. Hermann originated valuable reforms in the method of Greek grammatical instruction; and he is especially known for his editions of Æschylus, Euripides, Aristophanes, Bion, and Moschus, and for the controversies in which his theories involved him with other scholars.

Hermannstadt (hėr'man-stat), a town of Transylvania, on the Cibin, 54 miles S. S. E. Klausenburg. It consists of a high and a low town, connected by steep stone stairs, and of three suburbs. The high town is double walled and well built. Its origin dates back to the 12th century, and it was once an important fortress. It is the seat of the governor of the province and of the Greek metropolitan of Transylvania. The manufactures are varied, and there is an important transit trade, chiefly to and from Constantinople. Pop. 29,577.

Hermaphrodite (hėr-maf' rū-dīt), an animal in which the characteristics of both sexes are either really or apparently combined, especially an animal having the parts of generation both of male and female, so that reproduction can take place without the union of two individuals. Hermaphrodites are divided into true and spurious, the first exhibiting a real combination of the characteristics of the two sexes; while in the second the combination is only apparent. The animals in which the organs of the two sexes are normally combined in the same individual are confined to the invertebrate division of the animal kingdom, as for example certain groups of the inferior worms, molluscs, barnacles, etc. There are no real hermaphrodites in any of the higher species of animals.

Hermaphrodite Brig, a brig that is square-rigged forward and schooner-rigged aft.

Hermas (her'mas), one of the so-called apostolic fathers, generally supposed to be the person mentioned by that name in Rom., xvi, 14, though others maintain that he lived much later. He is known as the author of a work entitled the *Shepherd*, circulated at Rome early in the second century, and for which a place in the canon was even claimed. Only a few fragments exist of the Greek original, but the Latin translation, made at a very early period, appears to be complete. It is prized as a relic of the primitive church.

Hermeneutics (hėr-me-nū'tiks; from a Greek word meaning to explain or interpret), the science which fixes the principles of the interpretation of the sacred writings. Her-

meneutics bears the same relation to *exegesis* as *theory* to *practice*. See *Exegesis*.

Hermēs (her'mēs), called by the Romans *Mercurius* (see *Mercury*), in Greek mythology the son of Zeus and Maia, the daughter of Atlas. He was born in Arcadia, and soon after his birth left his cradle and invented the lyre by stringing the shell of a tortoise with three or seven strings. The lyre, however, he resigned to Apollo, with whom it was ever after identified. Hermēs also invented the Pandean pipe. The ancients represent Hermēs as the herald and messenger of the gods. He conducted the souls of the departed to the lower world. He was the ideal embodiment of grace, dignity, and persuasiveness, but also of prudence, cunning, fraud, perjury, theft, and robbery. His cunning was frequently of service both to the gods and the heroes, and even to Zeus himself. Later writers ascribe to him the invention of dice, music, geometry, letters, etc. He was worshipped in all the cities of Greece, but Arcadia was the chief place of his worship, his festivals being called *Hermæa*. In the monuments he is represented as in the flower of youth, or in the full power of early manhood. He often appears with small wings attached to his head and to his ankles. Among his symbols are the cock, the tortoise, a purse, etc., and especially his winged rod, the *caduceus*.

Hermēs.—Wall painting, Pompeii.

Hermes, Georg, a German theologian, born in 1775. He studied theology at the University of Münster; became teacher in the gymnasium of that city, and in 1807 professor of dogmatic theology in the university. When the Prussian government established the University of Bonn, Hermes was appointed to the chair of Catholic theology (1820). Here he distinguished himself by an ingenious effort to base the doctrines of the church on Kant's system of philosophy—an attempt known as Hermesianism. It aroused powerful opposition, being condemned as heretical by a papal letter of 1835, two years after the death of its originator.

Hermes Trismegis'tus, a mythical personage, the reputed author of a great variety of works, probably written by Egyptian Neo-Platonists, who ascribed the authorship of the highest attainments of the human mind to Thoth, the Egyptian Hermes; regarding him as the source of all knowledge and inventions, the *Logos* incarnate, thrice greatest (Gr. *tris megistos*). Clement of Alexandria mentions the contents of forty-two books of Hermes which were extant in his time. Of those which now remain the most important is the *Poimandrēs* or *Poimander*, a dialogue on nature, the creation, the deity, the soul, knowledge, and similar topics. Of the extant works none belongs, in all probability, to an earlier date than the fourth or perhaps the third century of our era.

Hermetic Art (her-met'ik), another name for *Alchemy* (which see).

Hermetic Sealing, the term used to denote a very old process in which a glass vessel, such as a tube or flask, has its neck so fused together that no part of the contained matter can escape, and nothing foreign can get in.

Hermitage (her'mi-tij), one of the finest French wines, produced along the Rhône between Valence and Valière, in the *ci-devant* Dauphiny. It is of two kinds, red and white; the former is preferred.

Hermit-crab, a name common to a family (Paguridæ) of well-known decapod crustaceans. These crabs take possession of and occupy the cast-off univalve shells of various molluscs, carrying this habitation about with them, and changing it for a larger one as they increase in size. There are several species, of various sizes, chiefly belonging to tropical shores.

Hermits. See *Anchorites*.

Hermon (hėr'mon), a mountain of Syria, belonging to the Anti-Lebanon, about 9400 feet high.

Hermopolis. See *Syra*.

Hermosillo (hėr-mo-sil'yō), a city in the state of Sonora, Mexico, on the river Sonora, 110 miles north from the port of Guaymas, with which it has a large traffic. It has a mint, distilleries, and flour-mills. Pop. 17,618.

Hernandia (hėr-nan'di-a), a genus of large East Indian

trees, forming the nat. order Hernandiaceæ. They have alternate entire leaves and flowers arranged in axillary or terminal spikes or corymbs. *H. sonora*, or Jack-in-the-box, is so called from the noise made by the wind whistling through its persistent involucels. The fibrous roots chewed and applied to wounds caused by the Macassar poison form an effectual cure, and the juice of the leaves is a powerful depilatory. The wood is light; that of *H. Guianensis* takes fire so readily from a flint and steel that it is used in the same way as amadou.

Hernandia sonora (Jack-in-the-box).

Herne, James A., actor and playwright, born at Troy, New York, in 1839; died in 1901. His plays include *Hearts of Oak*, *The Minute Men*, *Drifting Apart*, *Margaret Fleming*, and *Shore Acres*, the last-named the most popular.

Hernia (hėr'ni-a), in surgery, a tumor formed by the displacement of a soft part, which protrudes by a natural or accidental opening from the cavity in which it is contained. The brain, the heart, the lungs, and most of the abdominal viscera may become totally or partially displaced, and thus give rise to the formation of hernial tumors. But the term is ordinarily applied to abdominal hernia. Every part of the abdomen may become the seat of hernia, but it most commonly appears in the anterior and inferior region, which, being destitute in a great measure of muscular fibers, and containing the natural openings, offers less resistance to the displacement of the viscera. Most of the viscera, when displaced, push the peritoneum forward before them: this membrane thus forms an envelope of the hernia, which is called the *hernial sac*. The hernia itself is usually a loop of the small bowel, and though it has been pushed through the wall of the abdomen, forming a tumor under the skin, the fæces still pass along it. If the hernia can be returned to the abdomen, it is said to be reducible; if, from its size or other cause, it cannot be replaced, it is irreducible. A hernia is said to be strangulated when it is not only irreducible, but also subjected to a continual constriction, which interferes with the circulation through the blood-vessels of the part and the passage of the fæces. It may be rapidly fatal. Constriction may be produced by different causes, but generally occurs at the margins of the opening through which the hernia protrudes. As soon as a patient perceives that he is affected with a hernia he should have recourse to medical advice, for the disease is then in its most favorable state for treatment. The hernia when it is reduced must be prevented from recurring by the constant pressure of a pad or truss. An irreducible hernia must be supported with great care. All violent exercises, and excess in diet, must be avoided. The strangulated hernia requires prompt relief, and may necessitate an operation.

Hernösand (her'neu-sân), a seaport and cathedral town of Sweden, capital of Westernorrland, on the island of Hernö, in the Gulf of Bothnia, with a considerable shipping trade. Pop. 7890.

Hero (hē'rō), a Greek priestess of Aphrodītē at Sestos, on the coast of Thrace, for love of whom Leander, a youth of Abydos, swam every night across the Hellespont, guided by a torch from her tower. He was at length drowned in the attempt and his body washed ashore, when Hero, overcome with anguish, threw herself from the tower on the corpse of her lover, and perished. There is a Greek poem by Musæus on this subject.

Hero (of Alexandria), one of the most distinguished Greek mathematicians and mechanists of ancient times, who flourished about B.C. 150-100. A common pneumatic toy, called Hero's fountain, is attributed to him, and he also invented the æolipile, a heliostat, etc.

Herod (her'od), called the Great, King of the Jews, was a native of Ascalon, in Judea, where he was born about 74 B.C. He was the second son of Antipater the Idumean, who, being made procurator of Judea by Julius Cæsar, appointed Herod to the government of Galilee. He at first embraced the party of Brutus and Cassius, but after their death reconciled himself to Antony, by whose interest he was first named Tetrarch, and afterwards King of Judea. After the battle of Actium he successfully paid court to Augustus, who confirmed him in his kingdom. On all occasions his abilities as a politician and commander were conspicuous; but his passions were fierce and ungovernable, and his wife Mariamne, her brother, grandfather, and mother, and his own sons by her, were all put to death by him. He rebuilt the temple at Jerusalem with great magnificence, and erected a

stately theater and amphitheater in that city. He also rebuilt Samaria, which he called Sebaste, and constructed many strong fortresses throughout Judea, the principal termed Cæsarea, after the emperor. The birth of Jesus Christ is said to have taken place in the last year of the reign of Herod, viz., B.C. 4, the year also signalized by the massacre of the children of Bethlehem. Herod's policy and influence gave a great temporary splendor to the Jewish nation, but he was also the first to shake the foundation of the Jewish government, by dissolving the national council, and appointing the high priests and removing them at pleasuse, without regard to the laws of succession.

Herod Agrippa I, son of Aristobulus by Berenice, daughter of Herod the Great. For his attachment to Caligula he was imprisoned by Tiberius, but on the accession of Caligula (A.D. 37) he received the government of part of Palestine, and subsequently all the dominions of Herod the Great. To please the Jews, with whom his rule was very popular, he caused St. James to be put to death, and imprisoned St. Peter. He died in the circumstances related in Acts xii, in A.D. 44.

Herod Agrippa II, son of the preceding, and last of the Herodian line. Being too young to govern, Judea was, on his father's death, reduced to a Roman province. He subsequently received the kingdom of Chalcis, and obtained the superintendency of the temple at Jerusalem, where, with his sister, Berenice, he heard the defence of Paul before Festus. Being driven from Jerusalem by the revolt of the Jews, he joined Cestius, and later on Vespasian, and during the siege of Jerusalem was very serviceable to Titus. After its reduction (A.D. 70) he and Berenice (with whom he was suspected to have an incestuous intercourse) returned to Rome. He is supposed to have died there, A.D. 94.

Herod An'tipas, son of Herod the Great by his fifth wife, Cleopatra, was appointed tetrarch of Galilee on his death (B.C. 4). This was the Herod who put to death St. John the Baptist, at the request of his wife Herodias, John having reproached them for their incestuous union. Having visited Rome he was accused of having been concerned in the conspiracy of Sejanus, and was stripped of his dominions, and sent (A.D. 39) with his wife into exile at Lugdunum (Lyons), or, as some say, to Spain, where he died.

Herodiones (hē̇r-od-i-ō'nez), the herons, a modern name for an order of birds including the herons proper, but also the bitterns, storks, spoon-bills, ibises, etc.

Herodotus (hēr-od'o-tus), the oldest Greek historian whose works have come down to us, the 'father of history,' born at Halicarnassus, in Asia Minor, about B.C. 484. Before writing his history he traveled extensively, visiting the shores of the Hellespont and the Euxine, Scythia, Syria, Palestine, Babylon, and Ecbatana, Egypt as far as Elephantine or other parts of Northern Africa, everywhere investigating the manners, customs, and religion of the people, the history of the country, productions of the soil, etc. On returning home he found that Lygdamis had usurped the supreme authority in Halicarnassus, and put to death the noblest citizens, among others his uncle, the epic poet Panyasis, and Herodotus was forced to seek an asylum in the island of Samos. Having formed a conspiracy with several exiles he returned to Halicarnassus and drove out the usurper, but the nobles who had acted with him immediately formed an aristocracy more oppressive than the government of the banished tyrant, and Herodotus withdrew to the recently founded colony of Thurii, in Italy, where he seems to have spent most of his remaining life. Here, at an advanced age, we are told by Pliny, he wrote his immortal work, a statement strengthened by the fact that events are noticed in the body of the book which occurred so late as 409 B.C., while its abrupt ending proves almost beyond question that he was prevented by death from completing it. The history is divided into nine books, each bearing the name of a muse, and is written in the Ionic dialect. The object of the historian is to narrate the conflict between the Greeks and Persians, and he traces the enmity of the two races back to mythical times. Rapidly passing over the mythical period he comes to Crœsus, king of Lydia, of whom and of his kingdom he gives a comparatively full history. The conquest of Lydia by Cyrus induces him to relate the rise of the Persian monarchy and the subjugation of Asia Minor and Babylon. The history of Cambyses and his Egyptian expedition leads him to introduce the valuable details of the history, geography, and manners and customs of Egypt, which occupy the second book. The Scythian expedition of Darius causes the historian to treat of the Scythians and the north of Europe; and the subsequent extension of the Persian kingdom affords him the

opportunity for giving an account of Cyrene and Libya. In the meantime the revolt of the Ionians breaks out, which eventually brings on the conflict between Greece and Persia. An account of this outbreak and of the rise of Athens after the expulsion of the Peisistratidæ, is followed by what properly constitutes the principal part of the work, and the history of the Persian war now runs on in an uninterrupted stream until the taking of Sestos. There are English translations of his history by Beloe, Cary, and Rawlinson, the last being accompanied by important notes and dissertations.

Heroes (hē′rōz), a name applied by the Greeks to mythical personages who formed an intermediate link between men and gods. They were demigods, whose mortal nature only was destroyed by death, while the immortal ascended to the gods. The heroic age of Greece is considered to have terminated with the return of the Heraclidæ into the Peloponnesus (B.C. 1100.) There were six great heroic races, descended respectively from Prometheus and Deucalion, Inachus, Agenor, Danaus, Pelops or Tantalus, and Cecrops. Individual families, as, for instance, the *Æacidæ*, *Atridæ*, *Heraclidæ*, belong to one or another of these races. Great sacrifices were not offered to the heroes, as they were to the Olympian deities; but groves were consecrated to them, and libations poured out on their sepulchers.

Hérold (ā-rōld), Louis Joseph Ferdinand, a French musical composer, born in 1791; died in 1833. He entered the conservatoire at Paris, afterwards studied at Rome, and became musical tutor to the daughters of Murat, king of Naples. His first successful opera was *Les Rosières*, produced in 1817. This was followed by, among other minor compositions, *Le Muletier* (1823), and *Marie* (1826). His chief works, however, are the famous *Zampa* (1821), and the *Pré aux Clercs* (1832).

Heron (hėr′un), the common name of birds of the genus *Ardea*, constituting with the bitterns the family Ardeidæ, type of what is now commonly regarded as a separate order of birds, the Herodiones. The herons are very numerous, and almost universally spread over the globe. They are distinguished by having a long bill cleft beneath the eyes, a compressed body, long slender legs naked above the tarsal joint, three toes in front, the two outer united by a membrane, and by moderate wings. The tail is short, rounded, and composed of ten or twelve feathers. The common heron (*Ardĕa cinerĕa*) is about 3 feet in length from the point of the bill to the end of the tail, builds its nest in high trees, many being sometimes on one tree. Its food consists of fish, frogs, molluscs, mice, moles, and similar small animals. It has an insatiable voracity, and digests its food with great rapidity. It haunts fresh-water streams, marshes, ponds, and lakes, as also the sea-shore. It was for-

Common Heron (*Ardĕa cinerĕa*).

merly in high esteem for the table, and, being remarkable for its directly ascending flight, was the special quarry pursued in falconry by the larger hawks. The great heron (*A. herodias*) is an inhabitant of America, and is called also great blue heron; the great white heron or egret (*A.* or *Herodias alba*) belongs to Europe; and the green heron (*A. virescens*), the flesh of which is much esteemed, is a native of North America.

Heron. See *Hero*.

Herpes (hėr′pēz), a skin disease which, in most of its forms, passes through a regular course of increase, maturation, decline, and termination, in from ten to fourteen days. It is characterized by vesicles which arise in distinct but irregular clusters, and commonly appear in quick succession, and near together, on an inflamed base; generally attended with heat, pain, and considerable constitutional disorder. The term includes shingles and the like. The name herpes is given from the tendency of the eruption to creep or spread from one part of the skin to another (Greek *herpein*, to creep).

Herpetology (hėr-pe-tol′ō-ji; from Gr. *herpeton*, a reptile), that department of natural history which treats of reptiles. See *Reptile*.

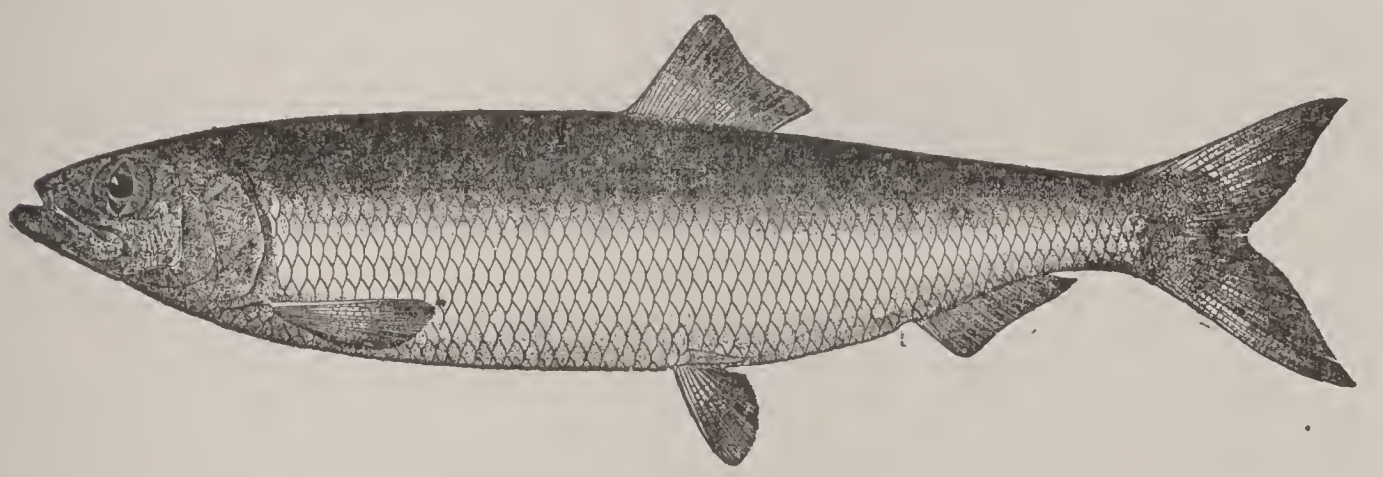
Herrera (ėr-rā′ra), Francesco, one of the greatest painters of the Seville school, was born there about 1576; died at Madrid in 1656. He de-

signed with spirit and vigor, and may justly be regarded as the founder of a new national school. His *Last Judgment* is a masterpiece of design and coloring. Equal praise is due to his *Holy Family* and the *Outpouring of the Holy Spirit.* He also displayed much skill in fresco painting and bronze work.—His youngest son, FRANCESCO, surnamed *El Mozo*, was born in 1622; died in 1685. He gained a great reputation in oil-painting and fresco, and became principal painter to Philip IV.

Herrick (her'ik), ROBERT, an English poet, born at London in 1591; died about 1674. He was vicar of Dean Prior in Devonshire for about 20 years; suffered deprivation under the government of Cromwell; but recovered his benefice after the restoration of Charles II, in 1660. His compositions were published in 1648, under the title of *Hesperides, or the Works, both Humane and Divine, of Robert Herrick.* It is a delightful collection of love lyrics, epigrams, sketches of rural scenery, etc. Notwithstanding his frequent coarseness he has been pronounced a writer of delightful Anacreontic spirit, and the best of the English lyric poets.

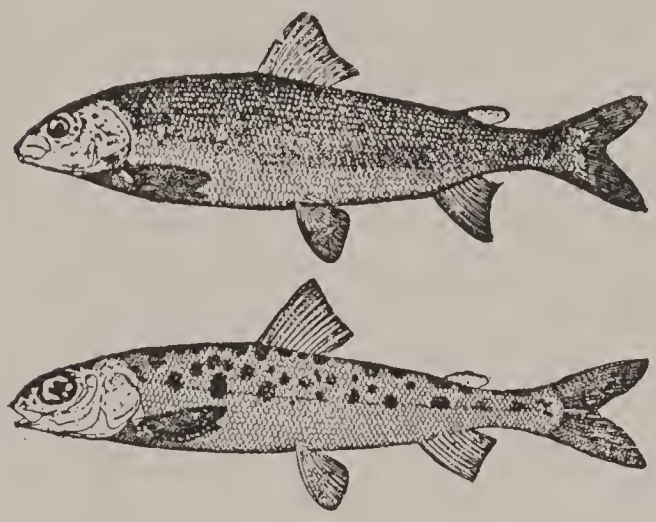
Herrin, a city of Williamson County, Illinois, 10 miles N. W. of Marion. It has a powder plant, machine shops and foundry, and there are many coal mines in its vicinity. Pop. 6861.

Herring (her'ing), the general name of fishes of the genus *Clupĕa*, the most important of which is the *Clupĕa harengus*, or common herring. It is of wide distribution in the North Atlantic, 45° N. lat. being about the southern limit. It measures from 10 to 12 inches in length, with blue-green back and brilliant silvery white under parts. It has small teeth in both jaws, and is of an elegant shape, the body being much compressed. It was formerly supposed that the herrings migrated in two great shoals every summer from the Polar Seas to the coasts of Europe and America, returning in the winter, but the migration is probably only from a deeper part of the ocean to a shallower. The feeding ground of the herring is probably the mud deposits found in the deeper parts of the sea, and it seems to be a fact that during their visits to the shallower waters of the coast for the purpose of spawning they do not feed, or feed very little. In summer the herring leaves the deep water where it has passed the winter and spring months, and seeks the coast where it may deposit its ova, and where they may be exposed to the influences of oxygen, heat, and sunlight, which are essential to their development. They are generally followed by multitudes of hakes, dog-fishes, etc., and gulls and other seabirds hover over the shoals. They swim near the surface, and are therefore easily taken by net. So great is their fecundity that the enormous number taken appears to produce no diminution of their abundance, as many as 68,000 eggs having been counted in the roe of one female. Herring, without any apparent cause, often desert parts of the coast where for a time they have been remarkably abundant, not returning in similar plenty till after the lapse of a number of years. Such seems to be the case on our Eastern coasts. The common American species, *C. elongata*, differs somewhat in its external appearance from the common European species, *C. harengus*, above described. It varies in length from 12 to 15 inches; the color above is deep blue, tinged with yellow, with silvery sides and lower parts. Herring are full of roe in the end of June, and continue in season till the beginning of winter, when they deposit their spawn. The mode of fishing for herring is by drift-nets, very similar to those employed in the pilchard fisheries; the



Pacific Herring.

fishing is carried on only in the night, the most favorable time being when it is quite dark, and the surface of the water is ruffled by a breeze. The food of the herring is believed to consist chiefly of minute crustaceans and *acaleptræ;* but it feeds also on small fishes, even the young of its own species. Other prominent members of the herring family (Clupeidæ), are the sprat or garvie (*Clupča sprattus*), the pilchard or gypsy herring (*C. pilchardus*), the whitebait, anchovy, etc. The alewife (*Calosa tyrannus*), a fish of the same genus as the shad, frequents the rivers of the Northern United States and Canada, and is popularly known as a herring. It is taken in large numbers, and is considered much superior to the common herring.



Mountain Herring (*Coregonus Williamsoni*). Upper, mature fish. Lower, young fish. (From Bulletin 47, U. S. Nat. Museum.)

Herrnhut (hėrn'höt), a village of Saxony, 50 miles E. of Dresden. It was founded by Count Zinzendorf in 1722, for the Moravian Brethren, and it afterwards became the metropolis and center of that sect of Christians, who, from this town, are often called *Herrnhuters.* See *Moravian Brethren.*

Herschel (hėr'shel), Caroline Lucretia, sister of the astronomer Sir William Herschel, born at Hanover in 1750; died in 1848. She joined her brother at Bath in 1771, and acted during his life as his astronomical assistant. She also found time to conduct a series of observations of her own. Her observations were published by the Royal Society, of which she was made an honorary member. On her brother's death she returned to Hanover.

Herschel, Sir John Frederick William, only son of Sir William Herschel, was born in 1792 at Slough, near Windsor; died in 1871. In 1813 he was graduated B.A. at Cambridge, and was senior wrangler and Smith's prizeman. After his father's death he spent eight years reviewing the nebulæ and clusters of stars discovered by his father. The results were given in 1833 to the Royal Society in the form of a catalogue of stars. The catalogue contained observations on 525 nebulæ and clusters of stars not noticed by his father, and on a great number of double stars, between 3000 and 4000 in all. In 1830 he produced his excellent *Preliminary Discourse on the Study of Natural Philosophy,* and about the same time published several treatises in the *Encyclopædia Metropolitana, Lardner's Cyclopædia,* etc. In 1834 he established, at his own expense, an observatory at Feldhuysen, near Cape Town, his object being to discover whether the distribution of the stars in the southern hemisphere corresponded with the results of his father's labors in the north. He returned to England in 1838, and 1847 was published *Results of Astronomical Observations made during 1834-38 at the Cape of Good Hope, being the Completion of a Telescopic Survey of the Whole Surface of the Visible Heavens.* He was one of the earliest pioneers in photography; was made a D. C. L. of Oxford; and on the queen's coronation he was created a baronet. In 1848 he was president of the Royal Astronomical Society, and in 1850 was appointed Master of the Mint, an office which he resigned in 1855. Among Sir John's other works are *Outlines of Astronomy, Familiar Lectures on Scientific Subjects,* and a translation of the *Iliad* in verse.

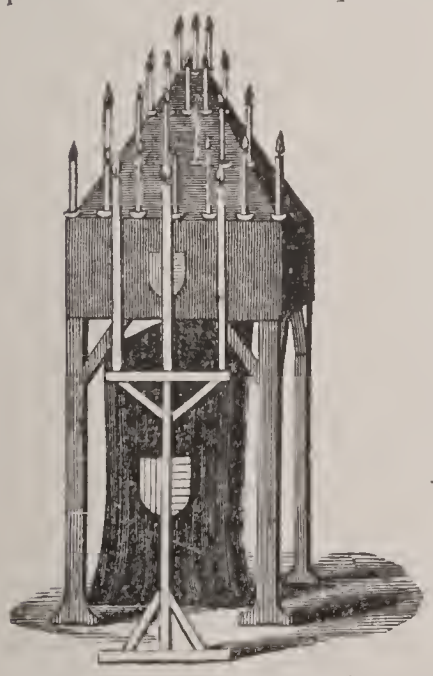
Herschel, Sir William, astronomer, son of a musician of Hanover, born in 1738; died in 1822. He came to England in 1757, and was employed in the formation of a military band, and in conducting, while organist at Bath, several concerts, oratorios, etc. Although enthusiastically fond of music, he had for some time devoted his leisure hours to the study of mathematics and astronomy; and being dissatisfied with the only telescopes within his reach, he set about constructing instruments for himself. Late in 1779 he began a regular survey of the heavens, star by star, with a 7-foot reflector, and discovered, March 13, 1781, a new primary planet, named by him the *Georgium Sidus,* but now known as *Urănus.* This discovery extended his fame throughout the world, and brought him a pension of £400 a year, with the title of private astronomer to the king. Assiduously continuing his observations, he measured the rotation of Saturn, discovered two of its satellites,

and observed the phenomena of its rings. He also discovered the satellites of Urănus, and observed the volcanic structure of the lunar mountains. At Slough, near Windsor, he erected a telescope of 40 feet length, and completed it in 1787. Herschel received much assistance in making and recording observations from his sister Caroline; and later his brother,

Sir William Herschel.

a skillful optical instrument maker, lent him valuable aid. In 1802 he laid before the Royal Society a catalogue of 5000 nebulæ and clusters of stars which he had discovered. He was made D. C. L. by the University of Oxford, and in 1816 was knighted.

Herse, HEARSE (hėrs), a framework whereon lighted candles were placed at the obsequies of distinguished persons. The funeral herse of the middle ages was a temporary canopy covered with wax-lights, and set up in the church; the coffin was placed under the herse during the funeral ceremonies. Sometimes it was a very elaborate structure. The name has been transferred to the modern carriage for bearing a dead body to the grave.



Herse.—MS. in Bodleian Library.

Hersfeld (hers'felt), a town of Prussia, province of Hesse-Nassau, 10 miles N. N. E. of Fulda. Pop. (1905) 8688.

Herstal (hėrs'täl), or HERISTAL, a town of Belgium, on the Meuse, 3 miles northeast of Liége. It was the residence of Pepin le Gros, and aferwards of several French kings of the second race; and has a church founded by Charlemagne. Pop. 20,114.

Hertford (hėrt'fėrd), an English town, capital of Hertford County, on the Lea, 19 miles north of London. It consists of three principal streets, meeting in a central square. There are breweries and oil and flour mills. The castle, which was built by Edward the Elder about 905, was occupied by John of Gaunt, and by the queens of Henry IV, V, and VI; and Elizabeth also resided in it occasionally. John II, King of France, and David, King of Scotland, were both in captivity here. Pop. 10,384.—The county of HERTFORD (contracted HERTS) is bounded by Cambridgeshire, Essex, Middlesex, Buckingham, and Bedford; area, 632 sq. miles, of which about five-sixths are arable, meadow, and pasture. The general aspect of the county is pleasing, being diversified by hill and valley, pasture lands, arable farms, and picturesque parks and woods. The principal rivers are the Lea and Colne, both of which have numerous tributaries. Agriculture employs a large number of the inhabitants; there are manufactures of paper, silk, and straw. Pop. (1911) 311,321.

Hertogenbosch. See *Bois-le-Duc.*

Hertz (hertz), HENRIK, a Danish dramatic poet, was born at Copenhagen, of Jewish parents, in 1798; died in 1870. He published several comedies anonymously in 1826-30. *Poetical Epistles from Paradise*, in which he imitated and satirized the affected style and spirit of his contemporaries, raised a great commotion at the time. He wrote a great number of poems and novels, but his best works are his plays. Among his best known are *Sparekassen*, *Ninon*, *Svend Dyring's Huus*, a tragedy founded on an old saga, and *King René's Daughter*, which has been translated and performed in France, Germany, and Britain.

Heruli (hėr'ū-lē), an ancient Germanic people, originally found on the northern shores of the Black Sea. Under the leadership of Odoacer they helped in the overthrow of the Western Empire. About the end of the sixth century they ceased to have a separate existence as a people.

Hervey (her'vē), JAMES, an English divine, born in 1714; died 1758. Having taken orders, he filled curacies in Hampshire and Devonshire, and in 1743 he became curate to his father, at whose death he succeeded to the livings of Weston Favel and Collingtree. His works, which had a great popularity notwithstanding their turgid and meretricious style, include *Meditations among the Tombs; Reflections in a Flower Garden; Descant on Creation; Contemplations on the Night and Starry Heavens; Theron and Aspasia*, religious dialogues; and a volume of *Letters*.

Hervey Islands, a group of islands in the Pacific Ocean, S. W. of the Society Islands, lat. 20° S., lon. 160° W., consisting of nine islands, either volcanic or coralline, the largest being Raratonga. The natives have legends of their migration from Samoa, and many have been converted to Christianity by English missionaries. Pop. about 7000. Called also *Cook's Islands*.

Herzegovina (hert-se-go-vē'nȧ), a province of the Balkan peninsula, now under the Austrian sway, bounded on the N. by Croatia and Bosnia, on the E. by Novibazar, on the S. E. by Montenegro, and on the S. and W. by Dalmatia; area, 700 square miles. The surface is generally mountainous, but contains many fertile valleys. Pop. about 220,000. An insurrection which broke out in July, 1875, formed the beginning of a train of events resulting in war between Russia and Turkey. In accordance with the Treaty of Berlin (1878) the province was occupied by Austrian troops, and, in common with Bosnia, was governed by an Austrian military governor until 1908, when the two provinces were annexed to the Austrian empire.

Herzen (hert'sen), ALEXANDER, a Russian writer, born in 1812 at Moscow; died at Paris in 1870. While a student at Moscow he imbibed extreme philosophical and socialistic views, which brought about his imprisonment and exile. He was afterwards pardoned, but spent the latter part of his life (from 1847) abroad. Among his numerous works are the novels, *Who is to Blame?* and *Dr. Krupow; Letters from France and Italy; On the Development of Revolutionary Ideas in Russia; Recollections of my Lifetime; Memoirs of the Empress Catharine*, etc.

Herzog (hār'zoh), JOHANN JAKOB, a German Protestant theologian, born at Basel in 1805; died at Erlangen in 1882. He was successively professor of historical theology at Lausanne, church history at Halle, and latterly at Erlangen. His chief works are *Calvin and Zwingli, Life of Œcolampadius and the Reformation in Basel*, and his great *Real-Encyklopädie für Protestantische Theologie und Kirche*, a vast collection of German learning and speculation, of which he was the editor, and to which he contributed over 500 articles.

Hesiod (hē'she-od), one of the oldest poets of Greece, belonging to the eighth century B.C. and connected with Ascra, a village of Bœotia, at the foot of Mount Helicon. Little is known of his life. Of numerous works attributed to him there remain only the *Theogony*, a collection of the oldest fables concerning the birth and achievements of the gods; the *Shield of Heracles*, a fragment of a larger work; and a didactic poem, *Works and Days*, which treats of agriculture, the choice of days, etc., with prudential precepts concerning education, domestic economy, etc.

Hesperides (hes-per'i-dēz), in Greek mythology, certain nymphs who lived in gardens, of rather uncertain locality, as guardians of the golden apples that grew there, being assisted in the charge by a dragon. Hesiod places the gardens in an island of the ocean far to the west. It was the eleventh labor of Heracles to kill the dragon and bring the golden apples of the Hesperides to Eurystheus.

Hesperornis (hes-per-or'nis), a fossil bird found in the chalk formation of Kansas, about 6 feet long, without wings, and having its jaws armed with teeth, which are not set in sockets, but in a common groove. It has been described as 'a kind of swimming, loon-like, raptorial ostrich, without fore-limbs, with the gape armed with formidable rows of strong teeth like a gigantic lizard, and with a large, broad, and flattened tail like a beaver.'

Hesperus (hes'per-us), among the ancient Greeks, a name of the evening star (the planet Venus).

Hesse (hes), or HESSEN, anciently a territory of Germany, situated mainly between the rivers Neckar, Rhine, Main, Lahn, and Fulda. After various fortunes it was ruled by the landgraf Philip I, who succeeded in 1509, and at his death in 1567 divided his dominions among his four sons. The death of two of these, however, reunited the territories in part, so that there remained only the two main divisions of Hesse-Cassel and Hesse-Darmstadt, the latter now known simply as Hesse. See following articles.

Hesse, or HESSEN, GRAND-DUCHY OF, formerly known as *Hessen-*

Darmstadt, an independent state of South Germany, consisting of sundry distinct portions. Of the two main portions, one (forming the provinces of Rheinhessen on the left, and Starkenburg on the right bank of the Rhine) lies immediately to the north of Baden, the other, Oberhessen (Upper Hesse), is entirely enclosed by the Prussian province of Hessen-Nassau; area of whole grand-duchy, 2964 sq. miles. Oberhessen is generally mountainous; the provinces Starkenburg and Rheinhessen are also mountainous towards their frontiers, more especially in the southeast, but there are also extensive plains belonging to the valleys of the Main and the Rhine. The climate is greatly diversified, being cold and bleak in the mountainous districts, and mild and pleasant in the valleys of the Rhine and the Main. Much of the soil, particularly in the provinces of Starkenburg and Rheinhessen, is remarkably fertile. The vine forms a most important object of culture, and fruit is very abundant. The principal towns are Darmstadt, the capital, Mainz, Giessen, Bingen, and Worms. About two-thirds of the inhabitants are Protestants. Pop. 1,119,893.—The Grand-duchy of Hesse originated in the division of the Landgraviate of Hesse in 1567. (See *Hesse.*) In 1806 the landgraviate was erected into a grand-duchy with an enlarged territory by Napoleon. It was reduced to its present limits in 1866, when it had to cede to Prussia some districts in the north, besides Hesse-Homburg, which, after being separated from it since 1596, had been reunited to it in the beginning of the year in which it was ceded. The reigning grand-duke, Ludwig (Louis), was married to Princess Alice of Great Britain.

Hesse-Cassel, or KURHESSEN ('Electoral Hessen'), a district of Germany, formerly an independent electorate, containing 4430 sq. miles, but now, with the exception of several small strips of territory, forming part of the Prussian province of Hessen-Nassau. It was founded in 1567. (See *Hesse.*) The last twenty years of its independent history is simply a narrative of conflicts between the people for political freedom and the elector for absolute rule. At last, on the outbreak of the German war of 1866, the elector declared himself on the side of Austria, and his territory was occupied by Prussian troops. On the conclusion of the war Hesse-Cassel was annexed to the Prussian territories as a conquered country.

Hesse-Darmstadt. *See Hesse, Grand-duchy of.*

Hesse-Homburg, before its absorption by Prussia after the German war of 1866, a landgraviate of Germany, consisting of two parts: the lordship of Homburg, situated N. N. W. of Frankfort, and the lordship of Meissenheim. It had an area of about 105 square miles, and a population of 27,000 inhabitants. The greater part of the public revenue was obtained from the gaming-tables of the watering-place, Homburg, the capital.

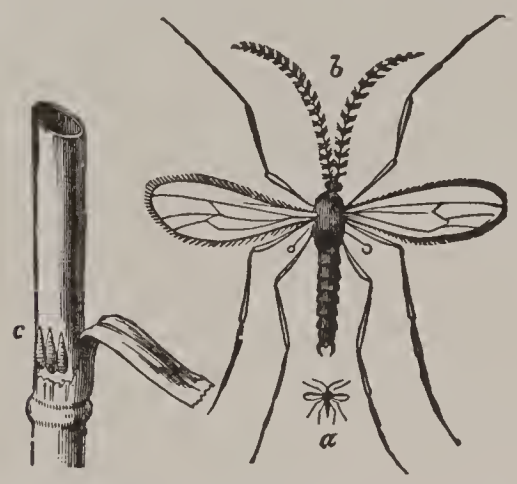
Hesse-Nassau, or HESSEN-NASSAU, a province of Prussia, formed out of the former Principality of Hesse-Cassel, the Duchy of Nassau, the Landgraviate of Hesse-Homburg, the territory and town of Frankfort, etc. It borders on the Prussian provinces of Westphalia, Hanover, Saxony, and the Rhineland, the Kingdom of Bavaria, etc., and encloses Upper Hesse. (See *Hesse, Grand-duchy of.*) The boundary is partly formed by the Rhine, Main, Weser, and Werra. Other rivers are the Lahn and Fulda. The greater part of this province belongs to the central German plateau, and has a rugged surface, partly covered by branches of the Harz. Still, about 40 per cent. of the whole is arable, while about the same is wooded. The chief mineral is iron. Mineral springs are numerous. The manufactures consist chiefly of woolens, cottons, and linen. The principal towns are Cassel, the capital, Wiesbaden, and Frankfort. Area, 6055 square miles. Pop. (1905) 2,070,052.

Hessian (hesh'an), a stout coarse cloth made of hemp.

Hessian Boots, a kind of high boots with tassel in front, worn over tight trousers, in fashion with military gentlemen in the eighteenth century.

Hessian Fly (*Cecidomyia destructor*), a fly of the family Tipulidæ, of the order Diptera (two-winged flies), the larva of which is very destructive to wheat, barley, and rye crops (it does not attack oats). It is so named from the unfounded belief, prevalent in America, where it is specially destructive, that it was brought over to that country in the baggage of the Hessian mercenaries employed against the Americans in the war for independence. The female fly is about the eighth of an inch in length, with a wing expanse of about a quarter of an inch. Its body is brown, with the upper parts, the thorax, and the head of a darker shade, approaching to black. The wings are of a dusky gray, and are surrounded with fringes. The male is somewhat smaller than the female and has longer antennæ. The

female flies usually lay their eggs on the young plants twice in the year, in May and September, out of which eggs the maggots hatch in from four to fourteen days. These work themselves in between the leaf-sheath and the stem, and fix themselves near the lowest joints, often near the root, and suck the juices



HESSIAN FLY (*Cecidomyia destructor*).
a, Male (natural size). *b*, Male (magnified).
c, Pupæ fixed on the joint of the wheat-stalk.

of the stem, so that the ear falls down at a sharp angle. These maggots turn to pupæ, from which the flies develop in about ten days. It has long been a pest in America and Germany, but did not appear in Britain till the summer of 1886.

Hestia (hes'ti-a), one of the later Greek goddesses, equivalent of the Latin Vesta.

Heteral'ocha See *Huia-bird.*

Heterocercal (h e t-e-ro-sèr'kal), a term applied to ganoid and elasmobranchiate fishes, in which the vertebral column runs to a point in the upper lobe of the tail, as in the sharks and sturgeons, causing this lobe to be much larger than the other.

Heterogenesis (h e t-e-ro-jen'e-sis), a term sometimes used as equivalent to spontaneous generation; otherwise applied to alternate generation. See *Generation.*

Heteroousians (het-e-ro-ou'zi-anz), in eccles. hist., a branch of the Arians who held that the Son was of a different substance from the Father. See *Homoousians.*

Heteropoda (het-er-op'o-da), an order of marine molluscs, the most highly organized of the Gasteropoda. In this order the foot is compressed into a vertical muscular lamina, serving for a fin, and the gills, when present, are collected into a mass on the hinder part of the back. The chief genera are *Carinaria* and *Firŏla.*

Heteroptera (h e t-er-op'tèr-a; Gr. *hetĕros*, different, and *pteron*, a wing), a section of hemipterous insects comprising those in which the two pairs of wings are of different consistence, the anterior part being h o r n y or leathery, but generally tipped with membrane. They comprise the land and water bugs. By s o m e naturalists the Heteroptera are separated from the Homoptera (the other section of the Hemiptera), and raised into a distinct order.

HETEROPTERA.
a, the Scutellum; *b*, Hemelytra.

Hetman (het'man), or ATAMAN, the title of the head (general) of the Cossacks. This dignity was abolished among the Cossacks of the Ukraine by Catharine the Great, and although the Cossacks of the Don still retain their hetman, the former freedom of election is gone, and the title of chief hetman is now held by the Russian heir-apparent to the crown.

Heuglin (hoi'glin), THEODOR, BARON VON, a German traveler, born in 1824; died in 1876. He first became known by his travels in the region of the White Nile and Abyssinia (1854); took part in the German expedition of 1861-62 to the Egyptian Soudan; and afterwards accompanied Mdme. Tinné in her expedition to the Upper Nile. In 1870-71 he made a journey to the region of Spitzbergen and Nova Zembla, and in 1875 a last journey to the shores of the Red Sea. He published several volumes of African travel and natural history.

Heureaux (hū-rō'), ULYSSES, President of San Domingo, born at Porto Plata, in 1846. He engaged in the war against Spain, was elected president in 1882 and twice re-elected, and after two unsuccessful efforts to assassinate him, he was killed in a third attempt, in 1899.

Hewlett (hū'let), MAURICE HENRY, an English novelist, born in 1861. His best known book is *The Forest Lovers*, a work of much merit, which was awarded an Academy prize in 1899. Others are *A Masque of Dead Florentines*, and *Songs and Meditations.*

Hexachord (heks'a-kōrd), in the ancient music, an interval of four tones and one semitone, equivalent to that which the moderns call a *sixth.*

Hexagon (heks'a-gon), a plane figure of six sides and six angles. When these lines are equal the figure is called *a regular hexagon.*

Hexahedron (heks'a-hē'dron), a figure having six faces, or a solid bounded by six planes. The term cube is now generally applied to the *regular hexahedron.*

Hexameter (heks-am'e-tėr), a verse of six feet, the heroic or epic measure of the Greeks and Romans. The sixth foot is always a spondee (two long syllables) or a trochee (a long and a short). The first five may be all dactyls (two short syllables and one long), or all spondees, or a mixture of both. The scheme of this verse then is—

—⏑⏑ | —⏑⏑ | —⏑⏑ | —⏑⏑ | —⏑⏑ | — —
or, — — | — — | — — | — — | — — | — —⏑

with all the varieties which the mingling of the two kinds of feet affords. In modern poetry the hexameter has been frequently used. In English hexameters accent is almost entirely substituted for length, and trochees generally take the place of spondees. Longfellow in his *Evangeline*, Kingsley in his *Andromeda*, and Clough in his *Bothie*, have adopted this form of verse. The following lines are specimens of Clough's English hexameters :—

O let us | try, he | answered, the | waters them | selves will sup | port us, |
Yea very | ripples and | waves will | form to a | boat under | neath us.

Hexandria (heks-an'dri-a), in the Linnæan system of botany, a class of plants having six stamens, which are all of equal or nearly equal length.

Hexapla (heks'a-pla ; Greek, *hexapla*, 'six-fold'), a collection of the Holy Scriptures in six languages; applied particularly to the combination of six versions published by Origen, containing the Hebrew text with a transcript of it in Greek characters, the Septuagint, and three other versions, those, namely, of Aquila, Symmachus, and Theodotion. It is only extant in fragments.

Hexastyle (heks'a-stīl), in architecture, a term applied to a portico or temple which has six columns in front.

Hexham (heks'am), a town of England, in Northumberlandshire, on the Tyne, about 20 miles west from Newcastle. There are here ruins of an abbey church, originally a cruciform structure, built about 674, destroyed two centuries later by the Danes, renovated in 1113, and demolished by the Scots in 1296. Hats, gloves, and leather are manufactured, but the industries are chiefly agricultural. Pop. 8417. The BATTLE OF HEXHAM, fought 15th May, 1464, was one of those belonging to the wars of the Roses. The Lancastrians under Somerset were defeated by Montague, the former being slain.

Heydeck (hī'dek), KARL WILHELM VON, sometimes called *Heidegger*), a Bavarian landscape painter, born at Saaralben, in Lorraine, in 1788; died at Munich in 1861. He entered the military academy at Munich in 1801, and rose to the rank of lieutenant-general. He served as a volunteer in the Peninsular campaign, and took an active part in the Greek war of independence. His pictures are numerous, the more important being preserved at Berlin and Munich. Among them are *Tyrolean Woodcutters, the Lion Gate at Myeenæ, The Aseent to the Aeropolis*, etc.

Heylin (hā'lin), PETER, an English theologian, born in 1600; died in 1662. He published his *Mieroeosmos, or Deseription of the Globe*, in 1625. In 1629 he became chaplain to Charles I, and obtained several benefices, from which he was ejected during the civil war. At the Restoration he was made subdean of Westminster. He wrote a *Life of Laud. A Defenee of the Chureh of England*, and several theological works.

Heyne (hī'nė), CHRISTIAN GOTTLOB, an eminent German scholar and critic, born 1729; died 1812. He was educated at Chemnitz and at Leipzig University, and after a long struggle with poverty he received, in 1763, an invitation to become professor of eloquence and poetry at Göttingen. He was soon after (1764) appointed first librarian, and remained here till his death. He particularly applied himself to classical criticism and the illustration of the writings of the ancients, and published valuable editions of Homer, Pindar, Diodorus, Siculus, Epictetus, Virgil, Tibullus, etc., all with full commentaries.

Heyse (hī'zė), PAUL JOHANN LUDWIG, a German novelist and dramatist, born at Berlin in 1830; settled at Munich in 1854. He wrote many plays, and short stories for newspapers and magazines; but his fame rests on his great novels, *Die Kinder der Welt* ('The Children of the World'), 1872; and *Im Paradiese* ('The Paradise Club'), 1875; generally recognized as among the most powerful and artistic works of modern German fiction.

Heywood (hā'wụd), a municipal borough of England, in Lancashire, about 8 miles northwest of Man-

chester. The making of power-looms, iron and brass founding, boiler-making, and all branches of cotton spinning and manufacturing, are extensively carried on. Pop. (1911) 26,698.

Heywood, JOHN, an early English dramatist, lived in the first half of the sixteenth century, and died at Mechlin about 1565. Sir Thomas More introduced him at the court of Henry VIII, with whom he became a favorite. His zealous attachment to the Roman Church recommended him to Queen Mary; but this very circumstance rendered him an object of suspicion during the two succeeding reigns, and he found it expedient to retire to the Continent. Heywood's dramatic works may be classed as *Interludes*, as they stand between the miracle-plays and the drama proper. Among them are: *A Mery Play between the Pardoner and the Frere, the Curate and Neybour Pratte; A Parable of the Spider and the Fly; the Four P's;* etc.

Heywood, THOMAS, dramatist, lived in the reigns of Elizabeth, James I, and Charles I. He was born in Lincolnshire, and educated at Cambridge. He composed wholly or in part 220 different plays. Of these only about twenty-four remain, of which the one most admired is *A Woman Killed with Kindness*, published in Dodsley's *Collection*. He was also the author of *Great Britain's Troy*, *An Apology for Actors*, and a number of other works.

Hezekiah (hez-e-kī'a; *Hizkiyah*, generally *Hizkiyahu*, strength of Jehovah), the twelfth King of Judah, and one of the best. He succeeded Ahaz about 717 B.C., and died about 698 B.C. He repressed idolatry, fought successfully against the Philistines, and hoped to become entirely independent of Assyria, but had his fenced cities captured, and was mulcted in a large tribute. About this time Hezekiah had a serious illness from which he miraculously recovered, and celebrated his fresh lease of life in a thanksgiving preserved in Isaiah, xxxviii. Among the ambassadors who came with letters and gifts to congratulate him on his recovery was the viceroy of Babylon, to whom he displayed the royal treasures. For this he received a terrible rebuke, and he was told by Isaiah that from Babylon would come the ruin and captivity of Judah. The greater part of the Scripture records bearing on the reign of Hezekiah is occupied by the two invasions of Sennacherib, and the sudden destruction of the Assyrian army. Hezekiah did not long survive this deliverance.

Hiawatha (hī-a-wâ'thâ), an Indian legendary hero and peace-maker, known by this name among the Iroquois and by other titles among the other tribes of North America. He is mentioned in various works on the aborigines, and in 1855 was immortalized in the poem, *Hiawatha*, by Longfellow.

Hibben, JOHN GRIER, an American educator, born in Peoria, Illinois, in 1861. He was graduated at Princeton University, in 1882, and at Princeton Theological Seminary, 1886. After a year of study at the University of Berlin he was ordained a Presbyterian minister in Chambersburg, Pennsylvania. In 1891 he became instructor at Princeton; in 1893, professor of logic; and in 1912, president of the university.

Hibbing, a village in St. Louis County, Minnesota, 80 miles N. W. of Duluth. It has mining and lumbering interests. Pop. 8832.

Hibernia (hī-ber'ni-a), the ancient name of Ireland, applied to it first by Julius Cæsar.

Hibiscus (hī-bis'kus), an extensive genus of plants, nat. order Malvaceæ (mallows), chiefly natives of tropical climates. They have large showy flowers, borne singly upon stalks towards the ends of the branches, these flowers having an outer calyx (called the epicalyx) of numerous leaves in addition to the true five-lobed persistent calyx. They are chiefly shrubs, one or two being herbs, and a few attaining the dimension of trees. The species are remarkable for abounding in mucilage and for the tenacity of the fiber of their bark, whence several are employed for many economical purposes in the different countries where they are indigenous. The petals of *H. rosa-sinensis*, a plant with large, handsome, usually red flowers, frequent in green-houses, are astringent, and used in China as a black dye for the hair and eyes. The handsome flowering shrub known in gardens as *Althæa frutex* is a species of hibiscus (*H. syriacus*). The root of *H. Manihot* yields a mucilage used in Japan as size and to give a proper consistence to paper. The leaves of *H. cannabinus* are eatable, and an oil is extracted from its seeds, while it is cultivated in India for its fiber.

Hiccup, or HICCOUGH, (hik'up), is a convulsive catch of the respiratory muscles, with sonorous inspiration repeated at short intervals. Though generally a trivial and transient inconvenience, its occurrence in the last stages of acute disease is often a fatal symptom.

Hickes (hiks), GEORGE, an English divine, philologist, and antiquary, was born in 1642; died in 1715. He became dean of Worcester in 1683,

but of this he was deprived in 1690 for refusing to take the oaths to William III after the Revolution. He followed the fortunes of James II, and was consecrated suffragan Bishop of Thetford in 1694 by the non-juring Archbishop Sancroft. Of his numerous works the most important are *Institutiones Grammaticæ Anglo-Saxonicæ et Mœso-Gothicæ*, etc. (Oxon. 1689), and *Linguarum veterum septentrionalium, Thesaurus Grammatico-Criticus et Archæologicus* (Oxon., 1705).

Hickory (hik'o-ri), the name given to several species of timber trees of the genus *Carya*, belonging to the nat. order Juglandaceæ (walnut). They are natives of the United States, and are remarkable for stateliness and general beauty. The wood is heavy, strong, and tenacious, and is used for making carriage-shafts, screws, whip-handles, cogged wheels, etc. The shag-bark (*C. alba*) yields the hickory nut of commerce, and its wood is very valuable. *C. olivæformis* yields the pecan-nut. The pig-nut or brown hickory is the *C. glabra*, and the swamp hickory is *C. amara*, so called from the bitterness of its nut.

Hicks, Elias, a noted preacher in the Society of Friends, born at Hempstead, New York, in 1748; died in 1830. He was an active abolitionist, and was instrumental in inducing the New York legislature to pass an act in 1827 which liberated all slaves within the state. His ministerial services were continued for 50 years without compensation, and he gradually came to advocate the most radical Unitarian doctrines. This in time led to a disruption of the society, a body being organized under his teachings who are now popularly known as 'Hicksites.'

Hidalgo (hi-dal'gō), a Spanish nobleman of the lower class. There were *hidalgos de naturaleza*, of noble birth, and *hidalgos de privilegio*, that is, those on whom the king had conferred nobility, and those who purchased nobility. The title is now obsolete.

Hide, of Land. See *Hyde*.

Hides (hīds), the skins of animals, either raw or dressed; but the name is more commonly given to the undressed skins of the larger domesticated animals, as oxen, horses, etc., the smaller being called skins. The hide trade is now an important one.

Hieracium (hī-er-ā'si-um). See *Hawkweed*.

Hiera Picra (hī'er-a pi'kra), 'Holy Bitter,' a warm cathartic composed of aloes and canella bark made into a powder and mixed with honey, still a favorite in domestic medicine and veterinary practice.

Hierapolis (hī-er-ap'o-lis), a ruined city of Asiatic Turkey, near the right bank of the Lycus, 121 miles east by south of Smyrna. It was famous for its thermal springs, was the birthplace of Epictetus, and is mentioned by St. Paul in his epistle to the Colossians (iv, 13).

Hierarchy (hī'ėr-ar-kē; from Gr. *hieros*, sacred, and *archē*, government), sacred government, sometimes the church, sometimes the rule which the ecclesiastical governing body exercised as at once priests and civil magistrates. In the former sense the hierarchy arose with the establishment of the Christian church as an independent society. In the middle ages the papal hierarchy gathered great strength, and the pope became a spiritual monarch, ruling western Christendom with power but feebly limited by princes and councils. A reactionary movement began in the 14th century, and the general tendency of subsequent events has always been to make the civil and hierarchical power more and more independent of each other. The term *hierarchy* as used to denote the governing and ministering body in the church, according to its several gradations, can strictly be applied only to those churches which are ruled by bishops, such as the Roman Catholic Church and the Anglican Church, which also holds the theory of a hierarchical gradation of rank and authority. Both these churches comprise the three orders of bishops, priests, and deacons.

Hieratic Writing (hī-ėr-at'ik; Gr. *hieratikos*, sacred), the mode of writing used by the Egyptian priests in their records. See *Hieroglyphics*.

Hiero I (hī'e-rō), an ancient Greek ruler or 'Tyrant' (that is, absolute monarch) of Syracuse in Sicily, brother of Gelon, whom he succeeded in 478 B.C. He was an enlightened ruler, and a patron of genius and learning. His court became the rendezvous of the most distinguished writers of his time, including Pindar, Æschylus, Bacchylides, Epicharmus, and Simonides. The *Hiero* of Xenophon contains the finest eulogium of this monarch. He was several times victor in the Grecian games. Pindar has celebrated his victories; several odes of this poet are filled with his praises. Hiero died at Catana, 467 B.C.

Hiero II, King or Tyrant of Syracuse (269-214 B.C.), son of Hierocles, a noble Syracusan, who claimed a descent from the family of

Gelon. He was chosen by the soldiers as general in 275 B.C., and recognized as king about 270. In 264 he made an alliance with the Carthaginians against Rome, and thus began the first Punic war. Being defeated by the Romans he made peace by the payment of tribute, and was ever after a faithful and useful ally to them. His subjects enjoyed great prosperity during his reign. Hiero devoted himself to the construction of military machines of all kinds, and ships of great size, under the direction of Archimedes, who lived in Syracuse during this reign.

Hierochloe (hī-ėr-ok'lo-e), HIEROCHLOA. See *Holy-grass.*

Hieroglyphics (hī - ėr - u - glif'iks; from Gr. *hieros,* sacred, and *glypho,* I engrave), a term originally applied to the inscriptions sculptured on buildings in Egypt, in the belief that the writing was confined to sacred subjects, and legible only to priests. The term has also been applied to picture-writing in general, such as that of the Mexicans and the still ruder pictures of the North American Indians. Three different modes of writing were used by the ancient Egyptians, the *Hieroglyphic,* the *Hieratic,* and the *Demotic.* Pure hieroglyphic writing is the earliest, and consists of figures of material objects from every sphere of nature and art, with certain mathematical and arbitrary symbols. Next was developed the hieratic or priestly writing, the form in which most Egyptian literature is written, and in which the symbols almost cease to be recognizable as figures of objects. Hieratic writings of the third millennium B.C. are extant. In the demotic or *enehorial* writing, derived directly from the hieratic, the symbols are still more obscured. The demotic was first used in the ninth century B.C., and was chiefly employed in social and commerical intercourse. Down to the end of the eighteenth century scholars failed to find a clue to the hieroglyphic writings. In 1799, however, M. Bouchard, a French captain of engineers, discovered at Rosetta the celebrated stone which afforded European scholars a key to the language and writing of the ancient Egyptians. It contained a tri-lingual inscription in hieroglyphics, demotic characters, and Greek, which turned out to be a decree of the priests in honor of Ptolemy V, issued in 195 B.C. The last paragraph of the Greek inscription stated that two translations, one in the sacred and the other in the popular Egyptian language, would be found adjacent to it. The discovery of an alphabet was the first task. The demotic part of the inscription was first examined by De Sacy and Akerblad, and the signification of a number of the symbols ascertained. The hieroglyphic part was next carefully examined and compared with the demotic and Greek. At last after much study Champollion and Dr. Thomas Young, independently of each other, discovered the method of reading the characters (1822), and thus provided a clue to the decipherment of the ancient Egyptian writing.

Hieroglyphic characters are either *ideographie, i. e.,* using well-known objects as symbols of conceptions, or *phonetie, i. e.,* representing words by symbols standing for their sounds. The phonetic signs are again divided into alphabetical signs and syllabic signs. Many of the ideographic characters are simple enough; thus the figure of a man, a woman, a calf, indicate simply those objects. Others, however, are less simple, and convey their meaning figuratively or symbolically. Water was expressed by three zigzag lines, one above the other, to represent waves or ripples of running water, milk by a milk-jar, oil by an oil-jar, fishing by a pelican seizing a fish, *i. e.,* fishing; seeing and sight by an eye; and so on. The nature of the phonetic hieroglyphs, which represent simply sounds, will be understood from an explanation of the accompanying cuts.

1. The first hieroglyph in the name of Kleopatra is a knee, which is *kne* or *klc* in Coptic, and represents the K of Kleopatra. K does not occur in the name Ptolemaios. 2. The second hieroglyph in Kleopatra is a lion couchant, which is *laboi* in Coptic, and *labu* in the old Egyptian, and represents the L of both names. In Kleopatra it occupies the second place, and in Ptolemaios the fourth. 3. The third hieroglyph in Kleopatra is a reed, which is *aké* in Coptic and *aak* in the old Egyptian and represents the E of Kleopatra. The reed is doubled in Ptolemaios and occupies the sixth and seventh places, where it represents the diphthong ai of Ptolemaios. 4. The fourth hieroglyph in Kleopatra is a noose, which represents the O of both names and occurs in the third place of Ptolemaios. 5. The fifth hieroglyph in Kleopatra is a mat, which represents the P of both names, and is the initial of Ptolemaios. 6. The sixth hieroglyph in Kleopatra is an eagle, which is *akhoom* in Coptic, and repre-

Cartouche of Cleopatra.

sents the A, which is found twice in the name Kleopatra, but does not occur in the name Ptolemaios, although the diphthong *ai* occurs as described above, No. 3. 7. The seventh hieroglyph in Kleopatra is a hand, which is *toot* in Coptic, and represents the T of Kleopatra, but does not occur in Ptolemaios, where it might be expected to occupy the second place. The second place of Ptolemaios is occupied by a semicircle, which is found at the end of feminine proper names, and is the Coptic feminine article T. The researches of Champollion satisfied him of the existence of homophones, or characters having the same phonetic value and which might be interchanged in writing proper names. 8. The eighth hieroglyph in Kleopatra is a mouth, which is *ro* in Coptic, and represents the R of Kleopatra. 9. The ninth hieroglyphic in Kleopatra is the eagle, which is explained in No. 6 above. 10. The semicircle is the T of Ptolemaios, which with 11, the egg found at the end of proper names of women, is a feminine affix. In the name of Ptolemaios there is still the M and the S to account for. The fifth hieroglyph in the cartouche of Ptolemaios is a geometrical figure, consisting of three sides of (probably?) a parallelogram, but now called a hole, because the Coptic *mu* has that signification, and represents the M. The hook represents the S of the word Ptolemaios. Vowels were only regarded by the Egyptians as they were needed to avoid ambiguous writing.

Cartouche of Ptolemy.

There are groups of hieroglyphs of which one element is an ideographic sign, to which a phonetic complement is added to indicate the pronunciation of the ideographic sign. The words of a text could be written in hieroglyphs in three ways—1, by phonetic hieroglyphs; 2. by ideographic hieroglyphs; and 3, by a combination of both. According to Ebers, in the perfected system of hieroglyphics the symbols for sounds and syllables are to be regarded as the foundation of the writing, while symbols for ideas are interspersed with them, partly to render the meaning more intelligible, and partly for ornamental purposes, or with a view to keep up the mystic character of the hieroglyphics.

Hieronymites (hī-ĕr-on'i-mīts), or JERONYMITES, hermits of St. Jerome (Hieronymus), an order of religious persons established in 1374, who wear a white habit with a black scapulary. They possessed the convent of St. Lawrence in the Escurial, and still have convents in Sicily, the West Indies, and South America.

Hieronymus, ST. See *Jerome, St.*

Higginson (hig'in-sun), THOMAS WENTWORTH, an American writer, born in Cambridge, Massachusetts, in 1823. An active abolitionist, he took part in the troubles in Kansas in 1856, and was colonel of a colored regiment in the Civil war. He is the author of works of history, fiction, biography, and essays, including *Malbone*, a romance, *Outdoor Papers*, *Oldport Days*, *History of the United States*, *Concerning All of Us*, *Tales of the Enchanted Islands*, etc. He died May 9, 1911.

High Altar. See *Altar.*

High Church, a term applied to a party in the Church of England. It originally indicated a party among the younger clergy during the latter part of the reign of Elizabeth, who asserted that Calvinism was inconsistent with the ancient doctrine and constitution of the primitive church, and who claimed a divine right for episcopacy. Bishop Andrewes was the chief writer of this party, and Laud became its most active leader. The term now generally refers to those who exalt the authority and jurisdiction of the church, and attach great value to ecclesiastical dignities and ordinances, being more or less identified with the ritualistic party. See *Ritualism.*

Highgate (hī'gat), a N. W. suburb of London, situated on a hill commanding fine views of the metropolis and the surrounding country, 5½ miles from St. Paul's.

High German, originally the Teutonic dialect spoken in the southern and elevated parts of Germany, as distinguished from Platt Deutsch or Low German, spoken in the northern and more lowland portions of Germany. See *Germany.*

Highlands (hī'landz), a somewhat indefinite geographical divison of Scotland, N. and W. of a line running N. E. from Dumbarton on the Clyde through the counties of Dumbarton, Stirling, Perth, Forfar, Kincardine; then N. W. through Aberdeen, Banff, Moray, and Nairn to the shores of the Moray Firth. The Highlands are generally subdivided into two parts, the West Highlands and the North Highlands. The whole of the district, which embraces the Celtic-speaking part of Scotland, is wild,

rugged, and mountainous, with much grand and picturesque scenery. The western coast is indented by many narrow arms of the sea, and is flanked by numerous islands. Forming, by their natural characteristics, a region distinct from the Lowlands of Scotland, the Highlands were long in a state of political semi-independence, and socially and otherwise —and particularly in retaining the use of the Gaelic tongue—the people have still certain characteristics peculiar to themselves. What especially separated this region from the rest of Scotland, was not only the Celtic language and blood, but also the clan system and all connected with it. See *Clan.*

In the earliest times the Highland chiefs gave allegiance to higher chiefs or princes, by whom the Scottish kings were acknowledged as sovereigns merely in name. Among these native princes were the powerful lords of the Isles, who flourished from very ancient times to the reign of James V. They ruled over all the Western Islands (the Hebrides) from Islay north, and over the western part of the county of Inverness, and as powerful allies exerted an influence over the greater part of the Highlands. In the early part of the fifteenth century the Highlanders threatened to overrun great part of the Lowlands, but they received a check in the defeat of Donald of the Isles at Harlaw in 1411. From this time onward their incursions on the Lowland parts of Scotland were confined chiefly to occasional plundering raids. In the wars of the seventeenth century the Highlanders were largely engaged on the side of the Stuarts, and great numbers fought under both Montrose and Dundee. After the suppression of the rising of 1715 a strenuous attempt was made to break up the tribal organization of the Highlanders. An act was passed in 1724 for their disarmament; between 1726 and 1737 great military roads were formed under the direction of General Wade, and a chain of fortified military posts constructed, to overawe the people. The chieftains made every effort to maintain their threatened power, and to destroy the effect of the innovations with which the government sought to weaken the bonds of the clans, but the weakening went on. The rebellion of 1745 gave the government an opportunity of hastening the process, by the abolition of heritable jurisdictions (which see), and of the ancient privileges of the chiefs. A stringent law for disarming the people was passed, and they were even prohibited from wearing their national dress, a prohibition not formally removed till 1782. The great extension of sheep-breeding and the appropriation of large tracts to game have tended much to depopulate some parts of the Highlands. In other parts, notably in some of the Western Islands, the population has increased beyond a point where their circumscribed condition could support them, and much discontent, agitation, and trouble have been the result. (See *Crofters.*) The Highland dress, so well known at the present day, is modern in a good many of its features, and especially so in the great variety of tartans that have been invented, and of which each clan now appears to claim one. There are a number of regiments in the British army originally recruited in the Highlands, and known as Highland regiments. or Highlanders. The organization of these is still kept up, each regiment having its distinctive tartan, some retaining the kilt, others wearing trousers.

Highness (hī′nes), a title of honor given to princes or other persons of rank, used with poss. pronouns *his, her,* etc., and with the addition of *royal, imperial, serene,* applied to the members of royal, imperial, and some German sovereign families.

High Places, in Scripture, eminences or mounds on which sacrifices were offered. Altars and places of worship were erected from the very earliest times on the tops of hills, etc. As such a practice led to idolatrous observances, it was strictly forbidden by the law of Moses. High places are frequently mentioned in conjunction with *groves.*

High Point, a city in Guilford County, North Carolina, 34 miles N. E. of Salisbury. It has wood-working mills and cotton, tobacco and other factories. Pop. 9525.

High Priest, the head of the Jewish priesthood. In the books of Moses the holder of this dignity is simply designated the priest; the epithet *high* occurs on one or two occasions, but as a distinctive epithet it appears to have been added subsequently. The formal consecration of Aaron, the brother of Moses, together with his sons, to a hereditary priesthood, is recorded in Exod., xxviii. The high priesthood continued in the line of Aaron, sometimes in one, and sometimes in another branch of it, until the coming of Christ. From B.C. 153 till the time of Herod the Great the regal and priestly authority were united in members of the Asmonæan family (the Maccabees). After the subjugation of the Jews the high priesthood was often arbitrarily conferred by the foreign masters. In the time of our

Saviour it appears to have been held by several priests alternately.

High Seas The claims of various the open sea or ocean. nations to exclusive rights and superiority over extensive tracts of the ocean highway have been settled after much controversy by a general international law. The principle now accepted is that the jurisdiction of maritime states extends only for 3 miles, or within cannon range of their own coasts, the remainder of the seas being high-seas, accessible on equal terms to all nations. Inland seas and estuaries, of course, are excepted.

High Treason. See *Treason.*

High Water, that state of the tides when they have flowed to the greatest height; also the time when such flow or elevation occurs. See *Tide.*

Highways. See *Road.*

Hilary (hil'a-ri), St., one of the early fathers of the church, born at Poitiers, of which city, after his conversion from heathenism, he became the bishop about 350. His contests with the Arians caused his banishment to Phrygia, whence he returned after some years, and continued to distinguish himself as an active diocesan till his death in 367 or 368.

Hilda (hil'da), Saint, a grandniece of Edwin, king of Northumbria, born about 614; died in 680. At the age of fourteen she was baptized along with her royal kinsman by Paulinus. She was consecrated by Bishop Aidan, and was successively head of the abbey of Hartlepool and of the famous monastery at Whitby. Cædmon, the Anglo-Saxon poet, was attached to the monastery during her rule.

Hildesheim (hil'des-hīm), a city of Prussia, the see of a bishopric, founded by Louis le Debonnaire in 818. It retains splendid specimens of mediæval architecture, and has iron, textile, and other manufactures.

Hildreth (hil'dreth), Richard, historian, was born at Deerfield, Massachusetts, in 1807. He graduated at Harvard in 1826. After practicing law for two years he became editor of the *Boston Atlas*, a leading political paper, in which his articles were remarkable for vehemence and historical illustration. In 1840 he went to Demerara, British Guiana, editing successively several journals, and writing *Theory of Morals* and *Theory of Politics*. He is best known, however, by his *History of the United States*, published 1849-56, and regarded as a standard work. He died at Florence, Italy, in 1865.

Hill, David Bennett, lawyer and statesman, born in Havana, New York, in 1843; died in 1910. He was admitted to practice of the law in 1864, was elected to the State legislature in 1870, and made lieutenant-governor of New York in 1882, succeeding Mr. Cleveland as governor when the latter became President. He was nominated and elected governor by the Democratic party in 1885 and again in 1888, and was made United States Senator in 1891. He was a prominent candidate for the presidential nomination in 1892, and in 1904 practically controlled the Democratic presidential nomination.

Hill, David Jayne, educator, born at Plainfield, New Jersey, in 1850. He was professor of rhetoric at Bucknell University in 1877-79; president, 1879-88; and president of the University of Rochester, 1888-96. He was appointed first assistant United States Secretary of State in 1898 and ambassador to Germany in 1908. He wrote several works on rhetoric, biographies, etc.

Hill, James Jerome, railroad official and financier, born near Guelph, Canada, in 1838. He was engaged for years in railroad enterprises in the West and in 1890 became actively interested in building the Great Northern Railway, extending from Lake Superior to Puget Sound. He became president of the Great Northern system in 1893, and retired in 1907, remaining chairman of the board of directors. He is director in numerous companies, and vice-president of the New York Chamber of Commerce.

Hill, Rowland, a popular preacher, notable for his humor and eccentricities, son of Sir Rowland Hill, Bart., of Hawkstone in Shropshire, was born in 1744; died in 1833. He was ordained in the Anglican Church, but embracing the views of the Calvinistic Methodists, he soon began to preach in barns and meeting-houses, and when they were too small or too distant, or not to be procured, in streets, fields, and highways. In 1783 he laid the foundation of Surrey Chapel in the Blackfriars Road, London, where he preached with great success every winter for about fifty years, making summer excursions to the provinces, where his preaching attracted immense crowds. He published sermons and other theological works, of which the best known are his *Village Dialogues.*

Hill, Rowland (Viscount Hill), a British general, nephew of the above, was born in 1772; died in 1842. He entered the army in his sixteenth

year, obtained the rank of captain in 1793, and became colonel of the 90th Regiment in 1800. He took part in the Egyptian campaign, and in 1806 was made major-general. He served with great distinction during the campaigns of Moore and Wellington in the Peninsula. In 1809 he became lieutenant-general; in 1812 he was made a K. B.; and in 1814, on being made a peer by the

Viscount Hill.

title of Baron of Almarez and of Hawkstone, Parliament voted him a perpetual pension of £2000. At Waterloo he commanded the right wing of the British, and he was personally thanked by Wellington for his services. In 1828 he was appointed commander-in-chief of the British army, a post which he held till 1842, when he retired and was made a viscount.

Hill, Sir Rowland, an English postal reformer, born at Kidderminster in 1795; died in 1879. He was engaged as a schoolmaster till 1833, shortly after which he was appointed secretary to the commissioners for the colonization of South Australia. In 1837 he published a pamphlet recommending the adoption of a low and uniform rate of postage throughout the United Kingdom. The scheme was approved by a committee of the House of Commons, which examined its details in 1838, and early in 1840 the penny postage system, which seems to have been originally proposed by Mr. James Chalmers of Dundee, was carried into effect with the assistance of Mr. Hill, who, for this purpose, received an appointment in the Treasury. In 1846 he received a public testimonial of the value of upwards of £13,000. In 1846, he was made secretary to the postmaster-general, and in 1854 chief secretary to the post-office. In 1860 he became K.C.B. He retired from the post-office four years later with a pension of £2000, besides a grant of £20,000 voted by parliament.

Hillah (hil'lä), a town of Asiatic Turkey, 60 miles south by west of Bagdad, on the Euphrates, among the ruins of ancient Babylon. It has good bazaars, and manufactories of silk and leather. The Euphrates is here crossed by a floating bridge. Pop. about 10,000.

Hillel (hil'el), a Jewish rabbi, born at Babylon about B.C. 112. He came to Jerusalem, it is said, at about forty years of age, became president of the Sanhedrim and founder of the school of Hillel. Shammai, another member of the Sanhedrim, became the head of a rival and hostile school. Hillel's party was the more liberal of the two, and became the dominant one.

Hill Forts, the refuges and strongholds of the early inhabitants, existing in every country of Europe. Their range in time extends from the early prehistoric through the early historic periods of the racial areas in which they are found. They were the original sites of various cities, such as Jerusalem, Athens, and Rome.

Hillsboro, (hils'bo-ro), a city, capital of Hill County, Texas, 66 miles S. W. of Dallas. It has manufactures of cotton cloth, cottonseed-oil, flour, etc. Pop. 6115.

Hillsdale, a city, capital of Hillsdale County, Michigan, 90 miles S. W. of Detroit. Its industries embrace screen doors, fur coats, flour, gas engines, etc. Pop. 5001.

Hill States, a collective name given to several independent and feudatory states of India. They are situated on the east side of the Sutlej, and comprise about twenty states, including Sirmar, Bilaspur, Bashahr.

Hill Tipperah, a native state of Hindustan, adjoining the British district of Tipperah, Bengal. The country is hilly, several ranges of hills running parallel from N. to S., with broad intervening valleys. Wild elephants and other large game abound in the forests. The principal crop is rice, and tea is indigenous in some parts of the hills. The government is despotic and patriarchal, and a resident political agent protects British interests. Area, 4086 square miles. Pop. 173,325.

Hill Tribes, the name given collectively to the numer-

ous wild tribes inhabiting the mountainous regions of India.

Hilo (hē'lō), the chief town of the island of Hawaii, and the second largest in the Sandwich Islands. It has the only harbor on the E. side of Hawaii and considerable trade, there being large sugar plantations in its vicinity. Pop. 19,785.

Hilprecht (hil'prekt), HERMAN VOLRATH, archæologist, born at Hohenerxleben, Germany, in 1859. In 1886 he became professor of Semitic Philology at the University of Pennsylvania, and was the leader of several expeditions sent to explore the sites of ancient Babylon and other Asiatic cities. He gathered much valuable material, has written many papers on Babylonian and oriental subjects, and is a prominent authority in cuneiform writings. His work on the subject of texts from the Nippur library gave rise to a widespread controversy.

Himálaya (hi-mä'lā-ya, or him-a-lā'ya; Sanskrit, *Himálaya*, the abode of snow), a chain of snowy mountains in Asia, the most elevated on the earth, which separates the Indian Peninsula from the plateau of Tibet, between the 72d and 96th degrees of E. lon., or between the Indus on the west and the Brahmaputra on the east; length about 1500 miles, average breadth about 180 miles. The direction of the Himálaya range from the Indus is for great part of its length from northwest to southeast, after which it curves gradually to the east, or slightly to the northeast. The great plain of India, south of the Himálaya, has a general elevation of 1000 feet above the sea. The transition from this plain to the ascent of the range is marked in the northwest by a belt of dry porous ground broken up into numerous ravines. East of this the *Tarai*, a belt of sloping marsh land, occupies the same position. The *Tarai* is covered with forest and jungle, is crowded with wild animals, and is very malarious. Beyond this lies the Bhabar, a belt of a gravelly and sandy nature covered with forests of valuable timber-trees. The *dúns*, *maris*, or *dwars*, longitudinal valleys partly cultivated and partly yielding forest growth, occupy the space between the *Bhabar* and the slope of the Himálayas themselves. The general height of the Himálayas is double that of the Alps; the passes over the former ordinarily exceed, often by half a mile, the elevation of Mont Blanc. The Ibi-Gamin Pass in Garhwal, the highest of all, is 20,457 feet, the Mustagh 19,019 feet, the Parangla 18,500 feet, the Kronbrung 18,313 feet, and the Dura Ghát 17,750 feet high. There are several summits in the Himálaya which approach closely to double the absolute elevation of the highest of the Alps, and 120 of them are stated to be above 20,000 feet. The rivers of the Punjab ('Five Waters') spring from a portion of the great chain which may be considered a distinct group under the title of the Northwestern Himálaya. Some of the peaks here rise to a height of 24,000 to 25,000 feet; or to 28,278 feet if the Karakorum is regarded as part of the Himálayas. In the Central or Middle Himalayas rise the sources of the Ganges and Jumna, in a region regarded by the Hindus as holy ground. Farther eastward, in Nepal, is the highest part of the Himálaya, so far as it is known and measured. Dhawalagiri has an elevation of 26,826 feet, the Gaurisankar or Mount Everest, the highest known mountain in the world, is 29,002 feet; the Yassa group rises to the height of 26,680 feet, the Ibjibia group to 26,306. Going farther east, in Sikkim, or on its borders, we find Kanchinjinga, the western peak of which is 28,156 feet high, the eastern 27,815 feet, while the Kábru ridge rises to 24,015 feet. Sikkim forms a comparatively narrow but interesting territory, walled in on three sides by stupendous mountains from 17,000 to 28,000 feet high. Here terminates the region of the Middle Himálaya, most of the streams from which unite in the Ganges. The Eastern Himálaya, which extends from Sikkim east to the Brahmaputra and completes the chain, sends all its waters to the last-named river, and is all comprised in Bhutan. A little to the east of Sikkim, Chamalari attains the height of 23,944 feet. About 250 miles further east a conspicuous group has been observed with two peaks, named the Gemini or Twins, 21,500 feet high. Thence towards the east the mountains sink rapidly, but the range may be traced beyond the right bank of the Brahmaputra. This stream, as well as the Indus, rises on the little-known north side of the Himálaya, their sources not being far apart. The snowy ridge of the Himálayas, as far as examined, consists everywhere of granite, with which are immediately associated gneiss and mica-slate, followed, in descending, by metamorphic and secondary rocks till we arrive at the more recent alluvial deposits. Earthquakes are still frequent within this region; and hot springs gush forth in abundance, even from beneath the snow. The limit of perpetual snow in the middle division (lon. 78° E.) is stated to be about 15,500 feet on the south side and 18,500 feet on the north-

ern. In Sikkim the snow-line descends on the south side to 14,500 feet, while on the north it rises to a level of 19,600 feet. Immense glaciers exist at various parts. The vegetation of the Himálayas is very rich, there being forests of pine, spruce, silver-fir, and deodar cedar at suitable elevations, with rhododendrons in rich profusion. Among the more characteristic animals are the yak, musk-deer, wild sheep, etc.

Himera (him'e-ra), an ancient Greek town on the N. coast of Sicily, the site of which is near the modern Termini. Here Gelon and Theron annihilated the army of Hamilcar the Carthaginian (480 B.C.). In 409 B.C. Hannibal, grandson of Hamilcar, razed the town to the ground.

Himyarites (him'yar-īts), a race or group of races in Arabia, regarded as descendants of Himyar, one of the mythical ancestors of the Arabs. According to tradition they became the dominant race in Yemen about 3000 years before Mohammed, and spread to the Euphrates on the one hand and Abyssinia on the other. Their most flourishing period appears to have been from about 100 B.C. till A.D. 629, when they succumbed to Mohammedanism. The *Himyaritic language*, not now spoken, formed, with the Arabic and Ethiopic, the southern branch of the Semitic family of tongues. During the last hundred years several hundreds of Himyaritic inscriptions have been collected, and deciphered by means of alphabets with the corresponding Arabic letters which had been preserved. The Mahrah tribes of S. Arabia are the direct descendants of the ancient Himyarites.

Hinckley (hink'lē), a town of England, partly in Warwickshire, but mostly in the county of Leicester. It lies 12 miles southwest of Leicester, and contains an ancient church. The staple trade is hosiery, but there are also large boot and shoe factories. Pop. (1911) 12,838.

Hincmar (hink'mar), Archbishop of Rheims, ecclesiastic and statesman, was born about 806; died at Epernay 882. He was at first a monk in the Abbey of St. Denis. In 845 he was elected archbishop of Rheims, where he exercised extensive political as well as ecclesiastical authority. He was a man of enlightenment, one of the best scholars of his age, and was distinguished as a defender of the liberties of the church. He wrote two treatises on Predestination, and numerous other works.

Hind (hīnd), the female of the stag, or red-deer. See *Deer*.

Hindi (hin'di), one of the languages of India, being that form of Hindustani which employs the Devanágari or Sanskrit character. There are many varieties of it.

Hindley (hind'lē), a town of England, in Lancashire, giving name to one of the parliamentary districts of S. W. Lancashire. Cotton manufacture is the chief industry, and coal abounds in the vicinity. Pop. 24,106.

Hinduism. See *Brahmanism*.

Hindu Kush (hin'dö kösh), or INDIAN CAUCASUS, a mountain system of Central Asia. It is generally considered as a continuation of the Himálayas, which it adjoins at the Indus, and then stretches west till it unites with the Ghur Mountains in North Afghanistan. Its culminating point, in the range of Hindu-Koh, to the north of Cabul, is far beyond the limit of perpetual snow, but is not supposed to exceed 20,000 feet. In many features the Hindu Kush resembles the Himálayas proper, though it is lower and destitute of forests.

Hindus, or HINDOOS. See *India*.

Hindustan (hin-du-stän'), the name commonly given to the whole Indian empire, but which properly applies only to the Punjab and the valley of the Ganges. See *India*.

Hindustani (hin-dus-ta'nē), one of the chief languages of India, having various forms or dialects. When written in the Persian character, and containing many Persian words and phrases, it is known as Urdu; another form of it is called Hindi (described at the top of this column).

Hinnom, VALLEY OF. See *Gehenna*.

Hinny (hin'i), a hybrid, the product of a stallion and a she-ass. It is smaller and inferior in strength to the mule produced by an ass and a mare, and it is also much less common.

Hiogo (hē-ō'gō), a seaport of Japan, opened to foreign trade in 1860. It is situated on the island of Hondo, on the Bay of Osaka, 40 miles S. W. of Kioto, with which it has railway communication. The trade with the interior is important, and the exports of tea, copper, fish, silk, etc., large. Pop. inclusive of Kobe, 285,002.

Hiouen-Thsang (yoo'en-tsang), a Chinese traveler and Buddhist priest, born about A.D. 602; died in 664. He wrote travels in India, and translated many Hindu books on Buddhism into Chinese.

Hip, the fruit of the dog-rose or wild-brier. It contains tannin, sugar, citric and malic acids, and is sometimes used in making conserves.

Hip-joint, the joint of the hip, a ball-and-socket joint formed by the reception of the globular head of the femur or thigh-bone into the socket or acetabulum of the os innominatum. For flexion, extension, rotation, and strength combined, it is the most perfect joint in the body.

Hipparchus. See *Hippias.*

Hipparchus (hip-ar'kus), an ancient Greek astronomer, was born at Nicæa, in Bithynia, and lived about B.C. 160-125. He resided for some time at Rhodes, but afterwards went to Alexandria, then the great school of science. A commentary on Aratus is the only work of his extant. He first ascertained the true length of the year, discovered the precession of the equinoxes, determined the revolutions and mean motions of the planets, prepared a catalogue of the fixed stars, etc.

Hipparion (hip-ar'i-on), a fossil genus of the horse family, of the Upper Miocene and Pliocene periods. The members are distinguished by the fact that each foot possesses a single fully-developed toe, bordered by two functionless toes which do not touch the ground, but simply dangle on each side of the central toe. The hipparion was about the size of an ass, one American species being, however, about the size of a goat.

Hippias (hip'pi-as), ruler of Athens, son of Pisistratus, after whose death (B.C. 527) he assumed the government, in conjunction with his brother Hipparchus. The latter being assassinated while conducting a solemn procession to the temple of Minerva, Hippias seized the reins of the government alone, and revenged the death of his brother by imposing taxes on the people, selling offices, and putting to death all of whom he entertained the least suspicion. His tyranny became at last unbearable, and he was expelled from the city B.C. 570.

Hippo (hip'ō), sometimes called *Hippo Regius* to distinguish it from another town of the same name on the Carthaginian coast; an ancient Numidian city, the ruins of which still exist a short distance south of Bona in Algeria. It was the episcopal see of St. Augustine, and was destroyed by the Vandals in 430.

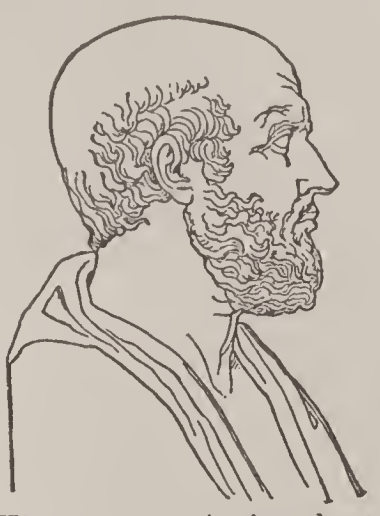
Hippoboscidæ (hip-u-bos'si-dē), a family of dipterous insects, parasitic on birds and quadrupeds. The type is the genus *Hippobosca* or horse-fly.

Hippocampus (hip-u-kam'pus), a genus of fishes, closely allied to the pipe-fishes, of singular construction and peculiar habits; the upper parts have some resemblance to the head and neck of a horse in miniature, which has suggested the name. When swimming they maintain a vertical position; their general length is from 6 to 10 inches, and they occur in the Mediterranean and Atlantic.

Hippocampus.

Hippocras (hip'u-kras), a medicinal drink, composed of wine (generally a mixture of Lisbon and Canary), with an infusion of mixed spices and other ingredients, formerly much used in England, and still common on the continent.

Hippocrates (hi-pok'ra-tēz), the most famous among the Greek physicians, the father of medicine, born in the island of Cos, B.C. 460. Besides practicing and teaching his profession at home he traveled on the continent of Greece, and died at an advanced age, B.C. 357, at Larissa, in Thessaly. His writings, which were early celebrated, became the nucleus of a collection of medical treatises by a number of authors of different places and periods, which were long attributed to him, and still bear his name. The best edition is that of Littré (in ten vols. 8vo, Paris, 1839-61). Among his genuine writings are the first and third books on epidemics; the aphorisms; on diet in acute diseases; on air, waters, and localities; on prognostics; on wounds of the head. Hippocrates was one of the first to insist on the importance of diet and regimen in disease. He had remarkable skill in diagnosis, practiced auscultation, and taught the doctrine of 'critical days.'



Hippocrates.—Antique bust.

Hippocrene (hip-o-krē'nē: 'The Horse's Fountain'), a

spring on Mount Helicon, a mountain in Bœotia, consecrated to the Muses, the waters of which possessed the power of poetic inspiration. It is said to have risen from the ground when struck by the hoofs of Pegasus.

Hippodrome (h i p′ u - drōm), the Greek name for the public place where the horse and chariot races were held. In Byzantine times the hippodrome at Constantinople acquired great renown, and factions originating in the hippodrome caused perpetual confusion in all departments of the public service. The name is sometimes applied to a modern circus.

Hippogriff (hip′u-grif), a fabulous animal or monster, half horse and half griffin.

Hippolytus (hip-pol′i-tus), in Greek mythology, son of Theseus, whose stepmother, Phædra, fell in love with him, and accused him to his father in order to revenge herself for his indifference. He was put to death, but his innocence being afterwards established, Phædra destroyed herself. See *Phædra.*

Hippolytus, an early C h r i s t i a n bishop and writer, the details of whose history are involved in obscurity. He appears to have lived about the beginning of the third century, and is supposed to have suffered martyrdom under Alexander Severus. The most important of his writings is the *Philosophumena*, a refutation of heresies, discovered in 1842.

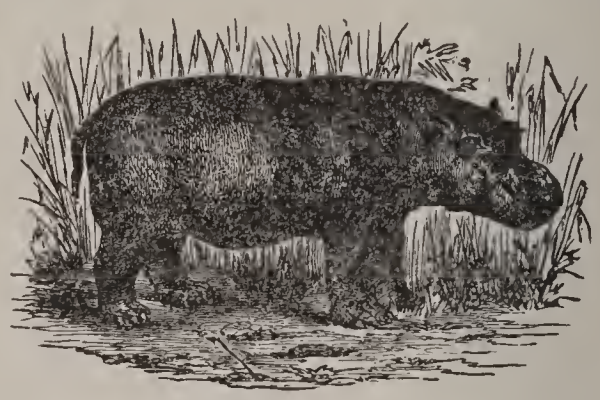
Hippomane (hip-om′ān), a genus of plants belonging to the Euphorbiaceæ. The *H. Mancinella* is the manchineel.

Hipponax (hip-po′naks), a Greek poet, born at Ephesus in 540 B.C., of whose works only a fragment of 100 lines remains. He was deformed in person, was banished from Ephesus for his satirical raillery, and lived in extreme poverty.

Hipponoüs. See *Bellerophon.*

Hippophagy (hi-pof′a-gi), the practice of feeding on horse flesh. Hippophagi was the name given by old geographers to certain nomadic Scythian tribes on the north of the Caspian Sea, who fed on horse flesh. Horse flesh has been eaten for a considerable time in Germany, and it has been regularly sold in Paris since 1866.

Hippopotamus (hip-po-pot′a-mus), the typical g e n u s of a family of Ungulates, of which two living species are known. One species, *H. amphibius*, is of large size, and is common throughout the greater part of Africa; the other, *H. liberiensis*, is not only smaller, but has other important differences, and is found only in the African west coast rivers, and those flowing into Lake Tchad. The former species has a thick and square head, a very large muzzle, small eyes and ears, thick and heavy body, short legs terminated by four toes, a short tail, two ventral teats, skin about 2 inches thick on the back and sides, and without hair, except at the extremity of the tail. The incisors and canines of the lower jaw are of great strength and size, the canines or tusks being long and curved forward. These tusks sometimes reach the length of 2 feet and more, and weigh upwards of 6 lbs. The animal is killed by the natives partly as food, but also on account of the tusks and teeth, their hardness being superior to that of ivory, and less liable to turn yellow. The hippopotamus has been found of the length of 17 feet, and stands about 5 feet high. It delights in water, living in lakes, rivers, and estuaries, and feeding on water-plants or on the herbage growing near the water. It is an excellent swimmer and diver, and can remain under water a considerable time. The *behemoth* of Job is considered by commentators to be the hippopotamus, as the description of his size, manners, food, and haunts is not unlike those of the latter animal. Among the ancient Egyptians it was revered as a divinity, as it is among the negroes in some localities. Several extinct species are found in old-world tertiary and diluvial formations.



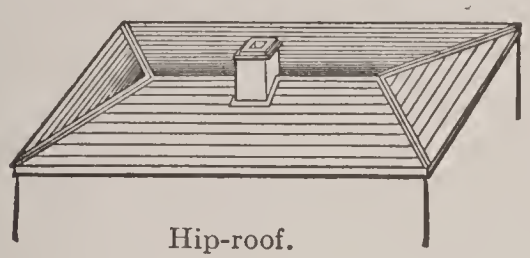
Hippopotamus (*Hippopotamus amphibius*).

Hippurites (hip-ur-ī′tēz), a genus of fossil bivalves, having the under shell of great depth, and of a conical form, with a flat lid or operculum, occurring in the lower chalk. They are allied to the living Chama, or gaping cockle. The *Hippurite limestone* is an important representative of the cretaceous rocks in the south of France and the

HIPPOPOTAMUS DEFENDING HER YOUNG

Pyrenees, characterized by a large admixture of shells of the family Hippuritidæ.

Hip-roof, a roof, the ends of which slope so as to have the same inclination to the horizon as its



Hip-roof.

other two sides, being thus of a triangular form.

Hirschberg (hirsh'ber*h*), a town of Prussia, province of Silesia, 26 miles southwest of Liegnitz, beautifully situated at the confluence of the Bober and the Zacken. It is well built, and has varied manufactures. Pop. (1905) 19,317.

Hisgen (his'jen), Thomas Louis, manufacturer, born at Petersburg, Indiana, in 1858. He began the manufacture of axle-grease in 1889 and in 1898 erected a factory for this purpose, said to be the largest of its kind in the world. He refused to sell out to the Standard Oil Co.; a fight was precipitated and Hisgen met the Standard Oil competition in his business by entering into the kerosene oil business. He was the candidate of the Independence League for State auditor of Massachusetts in 1906, for governor in 1907, and of the National Independence party for President in 1908.

Hispania. See *Spain.*

Hispanio'la. See *Hayti.*

Hissar (his-sär'), a town of Hindustan, in the Punjab, administrative headquarters of district of the same name, on the Western Jumna Canal, 102 miles W. of Delhi. Pop. about 17,000. The district has an area of 3540 sq. miles. Pop. 776,000. Hissar is also the name of a district of Bokhara, in which large crops of grain and cotton are produced. The capital, Hissar, about 250 miles S. E. of Bokhara, has about 18,000 population.

Histology (his-tol'ō-ji), the study of the tissues which enter into the formation of animals and plants, and their various organs, by means of the microscope and chemical and physical reagents. It may be described as a kind of minute anatomy. It comprehends the structure and mode of development of the various tissues, and is divided into animal histology and vegetable histology.

History (his'tu-ri; Greek *historia,* from *historeō,* I inquire into) is used by Herodotus in the sense which it has since retained, of a narrative of events and circumstances relating to man in his social or civic condition. A record of bare facts by themselves does not constitute history. Such a record (forming a chronicle or annals) is chronologically valuable; but to attain the dignity of history we must have social events and evolution detailed with considerable fullness, and the growth and movements of society, from one phase to another, distinctly traced and recorded. The modern school of historians devote much attention to the social life of the people; their method being further characterized by the utmost accuracy of research, the extreme importance assigned to contemporary documentary evidence, and careful weighing of data. The field of history proper is so far restricted as to its subject, that only the doings of a community possessing something of an independent organic life can constitute it. History may be conveniently divided into ancient, mediæval, and modern; but these divisions have little scientific value. The first includes the Jewish history and that of the nations of antiquity, reaching down to the destruction of the Roman Empire, A.D. 476; the second begins with 476 and comes down to the discovery of America in 1492, or to the Reformation; the third section extends from either of these eras to our own times. The earliest written history is found graven on the monuments of Egypt, Assyria, etc. These, though of the barest description, have the value of contemporary chronicles. Next come the histories found in the canonical books of the Old Testament; but the real inventors of the artistic form of history were the Greeks.

Hitchcock (hich'kok), Edward, a geologist, born at Deerfield, Massachusetts, in 1793; died in 1864. After being for four years minister of a Congregational church at Conway, Massachusetts, he was appointed in 1825 professor of chemistry and natural history at Amherst College, and in 1845 president of the same college, and professor of natural theology and geology. He was connected with the state survey of Massachusetts, Vermont, and part of New York, valuable reports on which he published. He was author of various other works, some geological and some of miscellaneous character. These include *Geology of the Connecticut Valley,* a highly popular work on *Elementary Geology, Illustrations of*

Surface Geology, Religion of Geology and its Connected Sciences, and *Reminiscences*, published shortly before his death.

Hitchcock, Ethan Allen, diplomatist, born at East Machias, Maine, in 1835; died in 1909. He engaged in mercantile and corporation pursuits, was appointed United States minister to Russia, in 1897, and ambassador in 1898, and entered the McKinley cabinet as Secretary of the Interior in 1899, holding the same office under Roosevelt until March, 1907. He was active in bringing about the prosecution of those accused of defrauding the Indians.

Hitchin (hich'in), a market town of England, in Hertfordshire, 34 miles north of London. The parish church, St. Mary's, contains some fine brasses of the fourteenth, fifteenth and sixteenth centuries, and a notable altarpiece by Rubens. Many women are employed in straw-plaiting, and lavender is largely grown in the vicinity. Pop. 11,905.

Hitopadesa (hit-ō-pa-dā'sha; Sanskrit, goodly instruction), an ancient Sanskrit work, taken from an older work called the *Panchatantra* or the five books, the source also of the collection known as the fables of Bidpai or Pilpay. The book consists of fables, one story growing out of another after the eastern fashion, with verses cited from ancient writers by the interlocutors, and was designed for the instruction of princes. It has been translated into many Asiatic and European languages.

Hittites (hit'īts), a Canaanitish nation first mentioned in connection with Abraham, who bought the field and cave of Machpelah from them. There are notices of them in Palestine during and after the captivity. Egyptian and Assyrian inscriptions seem to indicate that the nation consisted of a confederacy ruled by a number of chiefs, and many relics have been discovered within recent years, indicating that there was at one time a Hittite empire extending over a large area in Asia Minor and Syria. Their chief territory was in the Orontes Valley, and they seem to have played a prominent part in the history of Southwest Asia for a considerable period.

Hitu. See *Itu*.

Hivaoa (hē-va-ō'a), an island in the South Pacific Ocean, the largest of the southwestern group of the Marquesas; 22 miles long east to west; about 10 miles greatest breadth. It is mountainous, and bears indications of volcanic eruptions.

Hive. See *Apiary*.

Hivites (hī'vīts), a Canaanitish tribe first noticed in Gen., xxxiv. At the conquest of Canaan the main body occupied the northern confines of Western Palestine. Solomon subjected them to a regular tribute.

H'Lassa. See *Lassa*.

Hoadly (hōd'li), Benjamin, an English prelate, born in 1676; died in 1761. He was educated at Cambridge; took orders in 1700, and after being settled in London distinguished himself in controversy with Bishop Atterbury and others. A staunch low-churchman, he was appointed Bishop of Bangor, in 1715. A sermon preached before the king in 1717 gave rise to the 'Bangorian Controversy' regarding the divine authority of the king and the church. He was translated to the see of Hereford in 1721, to Salisbury in 1723, and Winchester in 1734.

Hoang-Ho (hō-ang-hō'), or Yellow River, a large river in China, the sources of which are in mountains in the Koko-Nor territory, north from Tibet. After a winding course of several hundred miles, it proceeds nearly due north to about lat. 41°; then east for nearly 200 miles, when it suddenly bends round, and flows directly south for about another 200 miles; then turns abruptly east, and flows in that direction till it reaches Lung-men-kau, when it diverges to the northeast, and falls into the Gulf of Pe-che-le, about lat. 37° 30′, and lon. 118° 30′. From the thirteenth century till 1853 the Hoang-Ho entered the sea in lat. 34°, south of the peninsula of Shan-tung, but at the latter date it took its present course. Since then vast sums have been spent in watching and strengthening the banks of the river, which is constantly overflowing at some point. In the autumn of 1887 the whole body of the river burst its banks about 300 miles from its mouth, and flooded about one-sixth of the province of Ho-nan, destroying towns and villages and causing a loss of life, the lowest estimate of which is one million. Its length is estimated at about 2600 miles. It derives its name from the vast quantities of yellow earth held in a state of solution by its waters.

Hoar (hōr), George Frisbie, senator, was born at Concord, Massachusetts, in 1826; died in 1904. He graduated from Harvard College in 1846, and afterwards from the Dane Law School, Harvard. He practiced law at Worcester, was elected to the state legislature in 1852, to the state senate, 1857; was mem-

ber of Congress, 1869-77, and United States Senator from 1877 until his death. He served on the Tilden-Hayes Electoral Commission and was chairman of the Republican National Convention of 1880. He has left valuable memoirs of his observations during his long career.

Hoar-frost. See *Frost.*

Hoarhound. See *Horehound.*

Hoatzin (ho-at'zin), or HOACTZIN, *Opisthocŏmus cristātus*, a singular gregarious South American bird, sometimes called the *crested touraco*, referred by some naturalists to the family Cracidæ (curassows), order Gallinaceæ; by some made to form an order by itself (Opisthocomi); by others regarded as of the order Insessores, and allied to the plantain-eaters. The plumage is brown streaked with white, and the head has a movable crest. It is of the size of a pheasant, and has an enormous crop with a very small gizzard.

Hobart (hō'bĕrt), up to 1881 HOBART TOWN, the capital of Tasmania, situated at the foot of Mount Wellington (4166 ft.), on the river Derwent, about 12 miles from its mouth. The city is built in the form of a square, the streets crossing each other at right angles. Among the public buildings are the government house, the government offices, the houses of parliament, town-hall, post-office, museum, Episcopal and Roman Catholic cathedrals, and several other places of worship, many public and private schools, the general hospital, etc. There are several jam manufactories, breweries, flour-mills, tanneries, a woolen factory, etc.; and in connection with the shipping interest first-class patent slips. The harbor is easy of access, and has ample depth, capacity, wharf and dock accommodation. Pop. 24,654.

Hobart (hō'bart), GARRETT AUGUSTUS, Vice-President, was born at Long Branch, New Jersey, in 1844. He adopted the legal profession and was a member of the New Jersey legislature, 1873-85, being president of the senate, 1881-82. He became very prominent in Republican politics, and after being defeated for the United States Senate in 1884, was nominated for Vice-President, and elected for the term 1897-1901. He died November 1, 1899, before the completion of his term.

Hobbema (hob'be-ma), MEINDERT or MINDERHOUT, a Dutch landscape painter; born at Amsterdam in 1638; died in 1709.

Hobbes (hobz), THOMAS, an English moral and political philosopher, born in 1588 at Malmesbury; died in 1679. He was educated at Oxford, and afterwards traveled on the Continent as tutor in the Earl of Devonshire's family, becoming acquainted with Gassendi, Descartes, Galileo, etc. He was also intimate with Lord Bacon (some of whose works he translated into Latin), Lord Herbert of Cherbury and Ben Jonson. From 1637 to 1641 he resided much at Chatsworth, but becoming alarmed at the probability of political commotions, he went to Paris. He stayed abroad some years, and during that time published most of his works. He also taught mathematics to the Prince of Wales (Charles II), then in Paris, who after the restoration gave him a pension of £100. He spent his latter days with the Devonshire family. The most remarkable of his works is his *Leviathan, or the Matter, Form, and Power of a Commonwealth* (1651). Other works are *De Cive* (1642), *De Corpore Politico* (1650), *De Libertate, Necessitate et Casu* (1654), and *Behemoth*, a history of the Civil war, published after his death. He also published a metrical version of the *Iliad* and *Odyssey*. In the history of the development of freethought in Europe Hobbes holds an important place, and he was one of the first great English writers on government. He conceived the state of nature to be one in which all things are at war with one another, and government as the result of a compact, suggested by selfishness, for the sake of peace and protection. Absolute rule was the best form of government, but this is qualified by the assertion that obedience to a ruler is due only so long as he can afford protection to the subject. His philosophy, depreciated among his contemporaries, was more or less adopted by Locke, Hartley, Hume and Priestly.

Hoboken (hō'bō-ken), a city of New Jersey, on the Hudson River, and close to Jersey City, which extends immediately to the south. It lies opposite New York, with which it is connected by steam ferries. It has various manufactories, and five lines of European steamers sail from this port. Among the public institutions is the Stevens Institute of Technology, with library and valuable sets of philosophical apparatus. Pop. 70,324.

Hobson (hob'sun), RICHMOND PEARSON, naval officer, was born at Greensboro, Alabama, in 1870, and graduated from the naval academy in 1891. During the 1898 war with Spain he took a collier, the *Merrimac*, into the entrance of Santiago harbor, and sunk her in the channel, with the purpose of closing it against the Spanish squadron

in the harbor. He and his companions escaped in a small boat and surrendered to the Spanish commander. For this he was promoted first naval constructor. He resigned and was elected to Congress, 1906, where he strongly insisted on the danger of war with Japan.

Hobson's Choice, a choice without an alternative; that which is tendered, or nothing; the one thing or none. This phrase is said to have originated from one Hobson, a livery-stable keeper at Cambridge, England, who obliged each customer requiring the hire of a horse to take the next in turn, or that which stood nearest the stable-door.

Hoche (ōsh), LAZARE, gēneral in the French revolutionary war, born in 1768. He took service in the French guards when sixteen years old, and at the revolution joined the popular party. He greatly distinguished himself at the siege of Thionville and the defense of Dunkirk, and shortly afterwards, when scarcely twenty-five years of age, received the command of the army on the Moselle. In 1793 he drove the Austrians out of Alsace, and soon after was arrested by the Jacobins and imprisoned at Paris. In 1794 he was released, and appointed commander of the army destined to quell the rising in the west, and afterwards to that in La Vendée. In 1796 he conceived the plan of attacking Britain, by making a descent on Ireland. He accordingly set sail in December from Brest, but the expedition utterly failed, and he was obliged to return without having even effected a landing. After his return he received the command of the army of the Sambre and Meuse. He opened the campaign of 1797 by a bold passage over the Rhine, and had defeated the Austrians in several engagements, when he was stopped in the path of victory by the news of the armistice concluded in Italy. He died suddenly in September of the same year (1797).

Hochst (hökst), a town of Prussia, in Hesse-Nassau, 6 miles W. of Frankfort. It has varied industries. Pop. 14,121.

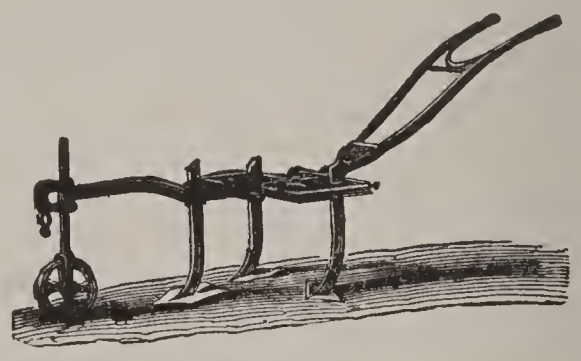
Hochstädt (hōh'stet), Bavaria, the scene of battle of Blenheim in 1704. Pop. 2471.

Hock, the name given to the German wines grown in the Hochheim district. It is a white still wine, but is sometimes rendered sparkling. The name is also applied to all the Rhenish wines.

Hockey (hok'i), a game at ball known as *shinty* in Scotland, and *hurling* in Ireland. It is played with a club curved at the lower end, by a number of persons divided into two parties or sides; and the object of each side is to drive the ball into that part of the field marked off as their opponents' goal. In the United States it is played by schoolboys, who usually call the game 'shinny.'

Hodometer (ho-dom'e-tėr; from Gr. *hodos*, a way, and *metron*, a measure), an instrument for measuring the length of way traveled by any vehicle. It consists of a clockwork arrangement fixed to the side of the vehicle, and connected with the axle. An index records on a dial the distance traveled.

Hoe (hō), an instrument for cutting up weeds and loosening the earth in fields and gardens, in shape something like an adze, being a plate of iron, with an eye for a handle, which is set at a convenient angle with the plate. The Dutch hoe differs from the common hand



Horse-hoe.

hoe in having the cutting blade set like the blade of a spade. A *horse-hoe* is a frame wheel-mounted, and furnished with ranges of shares spaced so as to work in the intervals between the rows of turnips, potatoes, etc. It is used on farms for the same purpose as the hand hoe, and worked by horse-power.

Hoe, RICHARD MARSH, inventor, born at New York in 1812; died in 1886. He invented in 1846 a rotary printing press, and subsequently the Hoe web-perfecting press. These inventions made a revolution in the art of newspaper printing, to which they were specially adapted.

Hof (hōf), a town in Bavaria, Upper Franconia, on the left bank of the Saale, 30 miles N. N. E. of Baireuth. It has woolen, linen, cotton, leather and paper manufactures. Marble and ironstone are worked in the vicinity. Pop. (1905) 36,348.

Hofer (ho'fer), ANDREAS, a Tyrolese patriot, born in 1767. In 1796 he led a rifle company against the French on Lake Garda, and after the Peace of Lunéville took a prominent part in the

organization of the Tyrol militia. In 1809 he took the lead in an insurrection of the Tyrolese for shaking off the yoke of Bavaria, to which their country had been transferred by the Treaty of Presburg. In a short time, with intermittent assistance from the Austrians, he defeated the French and Bavarian troops, and nearly the whole country was liberated. Hofer then carried on the military and civil administration, under the most singular circumstances, till the Peace of Vienna was proclaimed. Misled by false reports he commenced hostilities anew, and thus forfeited the protection of the amnesty. He remained concealed for some time, but was at last betrayed to the French, and carried to Mantua, where he was tried by a court-martial and shot, February 20, 1810. His family was indemnified for the loss of their property by the Emperor of Austria in 1819, and his son ennobled.

Hoffman (hof'man), CHARLES FENNO, poet and novelist, born at New York in 1806; died in 1884. He edited the *American Monthly Magazine* and the *New York Mirror;* published *Greyslaer*, a novel; *The Vigil of Faith, and other Poems;* and a number of songs, etc. During the last thirty years of his life he was afflicted with mental derangement. A complete edition of his poems was published by his nephew in 1874, with a critical introduction by W. C. Bryant.

Hoffmann, AUGUST HEINRICH, called also HOFFMANN VON FALLERSLEBEN, a German lyric poet and philologist, born at Fallersleben in Hanover in 1798; died at Corvey in 1874. Under the influence of the brothers Grimm he took to investigating old German literature, and became professor of German literature at Breslau in 1835. He also made special studies of Dutch and Silesian literature. He was dismissed in 1842 for the supposed revolutionary tendencies of his songs, and led a wandering life for some years. In 1860 he became librarian to the Duke of Ratibor. He published several volumes of songs, and works on the German language and literature.

Hoffmann, ERNST THEODOR AMADEUS, or, properly, ERNST THEODOR WILHELM, a German novelist, was born at Königsberg in 1776, where he studied law. He afterwards held several minor judicial appointments under government, and died in 1822, intemperate habits having ruined his health. He cultivated music and art, especially caricature, with success. Among his works of fiction are the *Phantasiestücke in Callot's Manier*, (1814); *Die Elixire des Teufels* (1816); the *Nachtstücke* (1817); the *Serapionsbrüder* (twenty-three tales, 1819, et seq.); *Lebensansichten des Kater Murr* (1820-22); and many others. In his longer novels he has a strong tendency to make use of supernatural machinery; but his masterpieces are his short stories.

Hofwyl (hof'vil), a village of Switzerland, 6 miles N. of Bern, noted as the seat of the educational institution founded by Fellenberg and Pestalozzi in 1802.

Hog, a general name for the ungulate or hoofed animals of the genus *Sus*, or swine. The head is prolonged into a pointed or truncated snout; the feet have four toes, two of which reach the ground, and the skin is very thick, and mostly covered with stiff bristles. The common hog (*Sus serofa*), in a tame state, is almost universal, except in very high latitudes. The prevailing color of the domestic animal is a dull yellowish white, sometimes marked irregularly with black and sometimes totally black. It is omnivorous in its habits, devouring almost any vegetable or animal substance. It is also very prolific, has usually two litters in a year, a litter consisting of from ten to even twenty. Its flesh forms a material part of the food of mankind, though Jews are strictly enjoined not to eat it, and Mohammedans agree in this prohibition. Pork takes salt better than almost any other meat, and hence forms an important article in military and naval stores. The lard of the hog is employed in a variety of preparations, and the bristles are used in large quantities in the manufacture of brushes, while the skin, when tanned, is used by saddlers, bookbinders, etc. The hog is erroneously looked on as a peculiarly stupid and gluttonous animal; it has also an undeserved reputation for filthy habits, but the too common filthiness of pig-sties is more the fault of the owner than the tenant. It wallows in the mire, but this is a peculiarity of the pachydermata, to cool themselves and provide a protection against insects. The wild-boar, from which most of our domesticated varieties are derived, is found in most parts of Europe and Asia. In size the wild animal considerably exceeds the domesticated hog, the legs are longer and more muscular, and the back therefore much higher. Hunting this animal has always been a favorite amusement, and can still be practiced in various parts of Europe. The wild hogs of Hindustan, which afford the amusement of 'pig-sticking' to the British resident there, belong to the species *S.*

cristātus, closely allied to the European wild-boar. Another species is found in Southeastern Asia, Java and various islands, and distinct from it is the Guinea hog of W. Africa, which is also said to have been naturalized in Brazil. As allied to the hog may be mentioned the *Babyroussa*, the genus *Phaeochœrus*, or wart-hogs, and the peccaries.

Hogarth (hō′garth), WILLIAM, painter and satirical artist, born at London in 1697; died in 1764. He was apprenticed to a silversmith, who employed him in engraving ciphers and crests on spoons and pieces of plate. In

William Hogarth.

1720 he commenced business for himself, painting portraits, and making designs and book-plates for the booksellers, etc. Among these was a series of illustrations to Hudibras. Besides portraits, he also painted miscellaneous subjects in oil. In 1729 he married the daughter of Sir James Thornhill, the painter, against her father's wishes, who is said, however, to have been mollified when Hogarth produced his celebrated series of pictures called the *Harlot's Progress*, a work which brought his great powers fairly before the public. The engravings of these, which became exceedingly popular, were published in 1734. This was followed by the *Rake's Progress* and *Marriage à la Mode*, two similar series of paintings and engravings; *Industry and Idleness*, *Beer Street and Gin Lane*, *The Election*, *The Enraged Musician*, *The Country-Inn Yard*, *The March to Finchley*, *Strolling Actresses Dressing in a Barn*, *Four Stages of Cruelty*, and a host of other engravings, which all evinced his extraordinary powers of satire, wit and imagination. Several portraits, notably those of himself, Garrick, Lovat and Wilkes, are masterpieces in their way. He was also ambitious of shining as an historical painter, but in this line he was not so successful. In 1753 his work on the *Analysis of Beauty* appeared, a treatise which brought him little fame, and which was severely ridiculed by his enemies and professional rivals. In originality of imagination and invention, and for vigor of realism and dramatic power, Hogarth stands in the highest rank, and his genius was always enlisted on the side of virtue and morality. Though best known as an engraver, he possessed high qualities as a painter. The best edition of his works is that published by Boydell (London, 1790), the plates of which, retouched by Heath and others, have been repeatedly published since.

Hog-deer. See *Axis*.

Hog-fish, the popular name given to teleostean fishes of the genus *Seorpæna*, family Scorpænidæ or Triglidæ. The best known species is the *S. serofa*, common in the Mediterranean, having the head flattened sideways, armed with spines, and adorned with membranous lobes or filaments. It is of a large size and a red color.

Hogg, JAMES, more familiarly known by the name of the *Ettrick Shepherd*, was born in Selkirkshire, Scotland, in 1770; died at Altrive, on the Yarrow, in 1835. After receiving a very scanty education, he began to earn his bread by daily labor as a shepherd. His early rhymings brought him under the notice of Sir Walter Scott, by whose advice he published a volume of ballads under the title of *The Mountain Bard*. The failure of an ill-judged agricultural scheme brought him to Edinburgh, where he published the *Forest Minstrel* (1810), and started a weekly periodical entitled *The Spy*, which, after a short time, became defunct. The appearance of the *Queen's Wake*, in 1813, with its charming ballad of *Kilmeny*, established Hogg's reputation as a poet. In 1815 he published his *Pilgrims of the Sun*, which was followed by *Mador of the Moor*, the *Poetic Mirror* (a collection of imitations of living poets), *Queen Hynde*, and *Dramatic Tales*, as well as by *The Brownie of Bodsbeck*, and other prose tales; the *Jacobite Relics* (partly written by Hogg), etc. From 1817 he had held the farm of Altrive from the Duke of Buccleuch at a merely nominal rent; but his farming schemes never throve, and he was generally in narrow circumstances.

Hog-gum, a resinous substance used for strengthening plasters, and also as a diuretic, laxative and stimulant medicine. In the West Indies it is employed as a substitute for pitch in tarring boats, ropes, etc. It is uncertain to what tree it is due.

Hog-plum, the popular name of the plants belonging to the genus *Spondias*, nat. order Anacardiaceæ. Some of the species yield pleasant fruits, as *S. purpurea* and *S. lutea* of the West Indies, the species generally called hog-plum, because their fruit is a common food for hogs.

Hog-rat, a genus (*Capromys*) of rodent animals, family Muridæ (mice), different species of which, including the musk-cavy, are found in the West Indies.

Hogshead, measure of capacity containing 63 old wine gallons, or 52½ imperial gallons. For beer it was 54 gallons, for rum 45 to 50 gallons, for brandy 45 to 60 gallons. Now seldom used in Britain, in the United States the word has come to signify a large cask. For tobacco it varies from 750 lbs. in some states, to 1200 lbs. in others.

Hohenlinden (hō-en-lin'den), a village of Bavaria, 20 miles east of Munich, celebrated for the victory gained by the French under Moreau over the Austrians under the Archduke John, December 3, 1800.

Hohenlohe (hō'en-lō-e), formerly a principality of Germany, containing 680 square miles, now chiefly under the sovereignty of Würtemberg, and partly under that of Bavaria.

Hohenstaufen (hō'en-stou-fn), a German princely family, several members of which filled the imperial throne. The founder of the family was Frederick, lord of Hohenstaufen, a castle in the Suabian Alps, who, for his services to the Emperor Henry IV, received the duchy of Suabia, and the hand of his daughter Agnes. His son Conrad was elected emperor in 1138. After the death of Conrad (1152) the confidence which was felt in the Hohenstaufen family caused the choice to fall on his nephew, Frederick III of Suabia, who was followed by Henry VI (1190), who added by his wife the kingdom of Sicily and Naples to the hereditary dominions of the family; and he again by Otto IV (1197) and Frederick II (1215-50), all belonging to the same house. After the death of Frederick II his son Conrad was acknowledged as his successor, with the title of Conrad IV, by most of the states of the empire; but Innocent IV laid him under an interdict, declared him to be deprived of all his lands, and persecuted him with relentless hatred till his death in 1254. The possessions of the family ultimately fell to Bavaria, Baden and Würtemburg.

Hohenstein (hō'en-stīn), a town in Germany, kingdom of Saxony, 10 miles northeast of Zwickau. Pop. 13,397.

Hohenzollern (hō-en-tsol'ėrn), a small territory of Germany, since 1852 an administrative division of Prussia. It consists of a long, narrow, irregular strip of country, entirely surrounded by Würtemberg and Baden. Area, 450 square miles. Pop. 66,720. The princely family of Hohenzollern dates from Thassilo, Count of Zollern, who died about 800 A.D. There have been several lines and branches, the main one being represented by the present imperial family of Germany.

Hoists. See *Lifts.*

Hokitika (ho-ke-tē'ka), a town of New Zealand (South Island), capital of the province of Westland, and the principal place on the west coast. It owes its rise to being the center of the productive gold-fields discovered in 1865. Pop. 2064.

Holacanthus. See *Coral Fishes.*

Holbach (hol'bâh), Paul Heinrich Dietrich, Baron von, philosopher, born at Heidelsheim, in the Palatinate, in 1723. He was educated in Paris, where he passed the greater part of his life, and died in 1789. He became the patron and associate of the encyclopædists, and contributed many papers on natural history, politics, and philosophy to the *Eneyelopédie.* The principal work attributed to him, which appeared under the name of M. Mirabaud, is the *Système de la Nature.* He afterwards published *Système Social, or Prineipes Naturels de la Morale et de la Politique: Bons Sens, or Idées Naturelles opposées aux Idées Surnaturelles*—a sort of atheist's catechism; *Eléments de la Morale Universelle;* etc., etc. According to Holbach matter is the only form of existence, and everything is the effect of a blind necessity.

Holbein (hol'bīn), Hans, an eminent German painter, born at Augsburg in 1497. He studied under his father, Hans Holbein the elder, a painter of considerable merit (1450-1526), and at an early age settled at Basel, where he exercised his art till about 1526. He then came to England, where letters from his friend Erasmus,

whose *Pancgyric on Folly* he had illustrated by a series of drawings, procured him the patronage of the chancellor Sir Thomas More. He was appointed court painter by Henry VIII; and in the Windsor collection has left portraits of all the eminent Englishmen of the time. The most celebrated of his pictures are the

Hans Holbein the younger.

Madonna at Darmstadt (better known through the replica at Dresden), representing the Burgomaster Meyer and his wives kneeling to the Virgin; and the *Solothurn Madonna*. His famous *Dance of Death* has been preserved only in the engravings of Lützelburger. There are a considerable number of engravings on wood and copper from Holbein's designs. He died at Whitehall of the plague in 1543.

Holberg (hol'bėrg), Ludwig, Baron, the father of modern Danish literature, was born at Bergen, in Norway, then part of the Danish dominions, in 1684; died at Copenhagen in 1754. He studied at the University of Copenhagen, and afterwards traveled through a good part of Europe, spending some time in Oxford, where he taught music and modern languages, and studied modern history and philosophy. In 1718 he was appointed to an ordinary professorship in the University of Copenhagen, where after this date he chiefly resided till his death. In 1735 he was elected rector, and in 1737 treasurer of the university in which he held his professorship, and in 1747 he was raised to the rank of baron. His works may be divided into four classes—poems, stage pieces, philosophical treatises and historical works. His poems are chiefly of a satirical nature. The most celebrated is *Peder Paars*, a comic heroic poem in fourteen cantos, which is still regarded throughout the Scandinavian countries as a masterpiece. Almost equally famous is his *Nicolas Klimm's Subterrancous Travels*, a satirical romance in prose. His stage pieces are all either comedies or farces, and are nearly all characterized by true comic power. Among his philosophical writings the most important is his *Moral Reflections* (1744). His historical works include *The Political, Ecclesiastical, and Geographical Condition of the Danish Monarchy*, *A General History of the Jews*, and *A History of Famous Men and Famous Women* (1739-45).

Holcus (hol'kus), a genus of grasses (nat. order Gramineæ), extremely common in some pastures, where they are called soft grasses. Whether because of their innutritious quality, or of the soft hairs with which they are covered, they are neglected by cattle. *H. saccharatus* contains a large quantity of sugar, and *H. odorātus* is celebrated for its fragrance. *H. lanatus* is the only North American species.

Hold (hōld), the whole interior cavity or belly of a ship, or all that part of her inside which is comprehended between the floor and the lower deck throughout her length.

Holdin, Edward Singleton, astronomer, born at St. Louis, Missouri, in 1846. He was professor of mathematics at the Naval Academy, 1873-81; president of the University of California, 1883-88; director of the Lick Observatory, 1888-98; afterwards astronomer of the Smithsonian Institution, and since 1901 librarian of the United States Military Academy. He has written many papers on astronomical and other subjects.

Holibut. See *Halibut*.

Holiday (hol'i-dā), any day set apart as a religious or national festival; in a general sense a day or a number of days during which a person is released from his everyday labors. In Britain certain days were fixed as bank-holidays by Parliament in 1871, and it was enacted that all business transactions which would have been valid on any such holiday shall be held as valid if performed on the day following. In most sections of the United States the holidays are New Year's Day, Lincoln's Birthday, Washington's Birthday, Good Friday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas. Other countries have patriotic holidays of historical significance to them, with various church and other holidays, while New Year's Day, Good

Friday and Christmas are kept as holidays throughout Christendom.

Holinshed (hol'inz-hed), RAPHAEL (RALPH), an English chronicler of whom nothing more is known than that he was descended from a family originally belonging to Cheshire, that he lived in the age of Queen Elizabeth, and that he died about 1580. He is only known by his *Chronieles of Englande, Scotlande and Irelande*, the first edition of which, known as the 'Shakespere edition,' because it is the one which is supposed to have been used by him in collecting material for his historical plays, was published in London in 1577. In the preparation of this work Holinshed was assisted by several of the most learned men of the day.

Holkar (hol'kår), the family name of the Maharajahs of Indore.

Holl (hol), FRANK, portrait and subject painter, son of Francis Holl, an eminent engraver, was born at London in 1845; died in 1888. He was a very successful student at the Royal Academy, and exhibited constantly from his student days. Among his best-known pictures are *Faees in the Fire, Fern-gatherers, No Tidings from the Sea, Leaving Home*, and *Gifts of the Fairies*. Later he devoted himself to portraiture, in which he greatly excelled, and painted many of the celebrities of the day.

Holland (hol'land), a fine and close kind of linen, so called from its first being manufactured in Holland; also a coarser linen fabric, unbleached or dyed brown, used for covering furniture, carpets, etc.

Holland, a city of Ottawa County, Michigan, 25 miles S. W. of Grand Rapids. It has extensive leather works, large woodenware and furniture factories, etc., and is a prominent grain market. It is the seat of Hope College and Western Theological Seminary. Pop. 10,490.

Holland, HENRY RICHARD VASSALL FOX, THIRD LORD, born in 1773; died in 1840. He succeeded to the peerage by the death of his father when less than one year old. In 1798 he took his place in the House of Lords, and as the nephew of Charles James Fox was at once acknowledged as a Whig leader, and a very able orator. In 1806 he was commissioner for settling disputes with the United States; lord privy seal in 1806-07; and chancellor of the Duchy of Lancaster. He wrote *Life of Lope de Vega* and *Foreign Reminiseenees*, published *Three Comedies from the Spanish*, and made Holland House the resort of the wit, talent and beauty of his day.

Holland, JOSIAH GUILBERT, author and editor, was born at Belchertown, Massachusetts, in 1819. In 1844 he was graduated at the Berkshire Medical College, but in his practice received but little encouragement. At the age of 30 he connected himself with the Springfield *Republiean*. Dr. Holland exhibited remarkable aptitude for journalism, and the paper soon became vastly popular. As an author many of his works were very successful, with immense sales. Prominent among them were *Bittersweet, a Dramatic Poem; Sevenoaks, Miss Guilbert's Career*, and *Nicholas Mintum*, novels, and *History of Western Massachusetts*. In 1870 Dr. Holland began editing *Seribner's Monthly*. He died in 1881.

Holland, KINGDOM OF. See *Netherlands*.

Holland, NEW, the name formerly given to the island or continent of Australia.

Holland, NORTH (*Noordholland*), and HOLLAND, SOUTH (*Suidholland*), two provinces of the Netherlands. The greater part of the former consists of a peninsula, bounded by the North Sea on the W. and the Zuider Zee on the E. Area, 1054 sq. miles. It lies very low, some portions of it being at least partially below the level of the sea, and is generally fertile. A broad margin of downs or sand-hills protects it from the sea on the west. Besides rivers (Vecht, Amstel, Zaan, etc.), it is intersected by the Great North Holland Canal. The chief towns are Amsterdam, Alkmaar, Haarlem, Helder, Zaandam. Pop. 968,104.—SOUTH HOLLAND, the most populous province of the Netherlands, is bounded on the north by North Holland, on the west by the German Ocean. The southern part of the province is broken up into several islands. Area, 1155 sq. miles. Like North Holland, it is a flat and depressed tract, and it also is protected from the sea on the west by a margin of downs or sand-hills. The chief river is the Rhine, with its numerous branches. The lakes were formerly numerous, but most of them are now drained. The soil is fertile and well cultivated. The principal towns are Delft, Dort, Gorkum, Gouda, Leyden, Rotterdam, Schiedam's Gravenhage (The Hague). Pop. 1,144,448.

Holland, PHILEMON, physician, teacher, and 'translator-general of his age,' born at Chelmsford, England, in 1551; died in 1636. He became master of the free grammar school of Coventry, and also practiced as a physician. His translations include Livy,

Pliny, Plutarch's Morals, Suetonius, Xenophon, etc., and he published an edition, with additions, of Camden's Britannia.

Hollands. See *Gin*

Hollar (hol'lär), WENZEL *or* WENCESLAUS, a Bohemian engraver, born at Prague about 1607; died at London in 1677. He accompanied the Earl of Arundel, the British ambassador to the German emperor, to London, who employed him to engrave some of the pictures of his collection. Among his numerous works, which are esteemed for their delicate, firm, and spirited execution, and which number some 2740 plates, is a set of twenty-eight plates, entitled *Ornatus Mulicbris Anglicanus*, representing the dresses of Englishwomen of all ranks and conditions in full length figures; Holbein's *Dance of Death*, etc.

Hollow Ware, the trade term for all kinds of vessels made of cast or wrought iron, and used for cooking and other purposes.

Holly (hol'i; *Ilex*), a genus of plants of the order Aquifoliaceæ, embracing a number of evergreen trees or shrubs. The common holly (*I. aquifolium*) is a native of Europe. It is a handsome, conical evergreen tree, growing to the height of 20 or 30 feet. Its leaves are dark-green, shining, and leathery, abundantly armed with prickles on the lower branches, but free from them on the upper, or on very old trees. The flowers are white, appearing in May, the fruit is red, ripening in September, and remaining on the tree all the winter. It is excellently adapted for hedges and fences, as it bears clipping. The wood is hard and white, and is employed for turnery work, knife handles, etc. The bark yields a mucilaginous substance, from which birdlime is made. Among the Romans it was customary to send boughs of holly to friends, with new-year's gifts, as emblematical of good wishes; and it is used to decorate houses at Christmas. The American holly (*Ilex opaca*) is widely diffused throughout the United States. It sometimes attains the height of 80 feet, with a trunk 4 feet in diameter. The *I. glabra* is another species of holly, inhabitating the coast regions of the United States. Its leaves furnished the 'black drink' which used to hold an important place in Indian ceremonies. The maté or Paraguay tea-plant is a species of holly (*I. Paraguayensis*).

Hollyhock (hol'i-hok), a biennial plant. (*Althæa rosca*), nat. order Malvaceæ. It is a native of China, and is a frequent ornament of gardens. There are many varieties, with single and double flowers, characterized by the tints of yellow, red, purple and dark purple approaching to black. It reaches a height of 8 feet or more.

Holmes (hōmz), OLIVER WENDELL, writer, born at Cambridge, Massachusetts, in 1809, and educated at Harvard University. He began the study of law, but in a short time relinquished

Oliver Wendell Holmes.

it for that of medicine. In 1839 he became professor of anatomy and physiology in Dartmouth College, New Hampshire, but resigned after two years' service in order to devote himself to practice in Boston. In 1847 he was appointed to the chair of anatomy at Harvard, a position which he filled till 1882. As an author he was prolific both in prose and verse, and shone as a prominent figure in the famous group associated with the *Atlantic Monthly*. His chief works, besides several volumes of poems, and treatises on medicine, are *The Autocrat of the Breakfast Table*, *The Professor at the Breakfast Table* and *The Poet at the Breakfast Table; Elsie Venner*, *The Guardian Angel*, *A Mortal Antipathy* and *Memoirs of Motley* and *Emerson*. A visit to Europe in 1886 produced a charming record, *A Hundred Days in Europe*. Many of his lyrics became very popular. He died October 7, 1894.

Holm-oak, *Quercus Ilex*, a shrub-like tree, native of the Mediterranean countries, with holly-like leaves. In its native countries it attains a considerable size and age, but in Britain it forms an ornamental evergreen bush of from 20 to 30 feet high, seldom becoming single-stemmed.

Holofernes (hol-o-fer'nēz). See *Judith*

BIRTHPLACE. CAMBRIDGE, MASS.

HOLMES IN HIS STUDY

DR. OLIVER WENDELL HOLMES

OLIVER WENDELL HOLMES

The Poet's Birthplace and Study.

Successively law student, physician and Harvard professor of anatomy, Holmes' undying fame rests on his authorship. "The Autocrat of the Breakfast Table" was beloved for his geniality, of which these intimate photographs give some suggestion.

Holograph (hol'u-graf), any writing, as a letter, deed, will, etc., wholly written by the person from whom it bears to proceed. In Scots law a holograph deed is valid without the signatures of witnesses, but in English law every deed, whether holograph or not, must have the names of two witnesses attached to it to render it valid. The rule as to witnesses varies in the various states of this country.

Holoptychius (hol-op-tik'i-us), a genus of fossil ganoid fishes occurring in the upper old red sandstone. The head was covered with large plates, and the body with bony scales, rhombic or cycloid in form. The jaws, besides being armed with numerous sharp-pointed fish-teeth were furnished with large teeth of a conical form.

Holothuria (hol-o-thū'ri-a), the type of an order of Echinoderms, the *Holothurioidea* or sea-cucumbers. This order is destitute of the calcareous plates typical of the class, but has a leathery integument open at both ends, and pierced by orifices through which suctorial feet or ambulacra protrude. They have the mouth surrounded by tentacula; a long convoluted alimentary canal; respiratory organs near the anus, and generally in the form of two branching arborescent tubes (forming the 'respiratory tree') into which the water is admitted; and the organs of both sexes in each individual. They are capable of extending themselves to several times the length they have in a state of repose, and of extraordinary reproduction of parts, even of vital organs. The young undergo a metamorphosis during development. They abound in the Asiatic seas, the bêche-demer or trepang being a member of the family, and highly esteemed in China as an article of food.

Holst, Hermann, Eduard von, historian, born at Fellin, Livoisia (Russia), in 1841; removed to New York in 1864; was subsequently professor of history at Strasburg and Freiburg. He wrote a very able *Constitutional History of the United States*, also *Constitutional Law of the United States*, and *Life of J. C. Calhoun*. He died in 1904.

Holstein (hōl'stīn). See *Schleswig-Holstein*.

Holster (hōl'ster), a leathern case for a pistol, carried by a horseman at the fore part of his saddle, and frequently covered with wool or fur.

Holy Alliance, a league concluded at Paris, September 26, 1815, between Alexander I, emperor of Russia, Francis of Austria, and Frederick William III of Prussia, and signed with their own hands, and without the countersign of a minister. It consisted of a declaration, that, in accordance with the precepts of the gospel of Jesus Christ, the principles of justice, charity, and peace should be the basis of their internal administration, and of their international relations, and that the happiness and religious welfare of their subjects should be their great object. Its real aim, however, was to maintain the power and influence of the existing dynasties, and its methods were by no means in accordance with its title. It was offered for signature to all the European powers except the pope and the sultan of Turkey, and accepted by all except Britain. Its purpose of aiding Spain in subduing her American colonies, with the idea of acquiring for its members territory in America, was a leading cause of the promulgation of the Monroe Doctrine, which put a definite end to the scheme. The events of 1848 broke up the Holy Alliance.

Holy Coat of Treves, a relic preserved in the cathedral of Treves, and claimed to be the identical seamless coat worn by our Saviour at his crucifixion, and for which the soldiers cast lots. It was the gift of the Empress Helena, by whom it was discovered in her visit to Palestine in the fourth century. It has been exhibited to vast numbers of pilgrims at irregular intervals. The same claim is made for several coats kept in other places.

Holy Family, in art, representations of the infant Saviour and his mother, accompanied by one or more members of his family.

Holy Ghost, according to Trinitarians, the third Person in the Holy Trinity; according to the Socinians, a Biblical metaphor, to designate the divine influence. The doctrine of the Athanasian creed adopted by Roman Catholics, Lutherans, and Calvinists alike, is that the Holy Ghost proceeded from both Son and Father, and is coeternal and equal with both. The Eastern Church, however, following the Council of Alexandria held in 362, asserts that the Holy Ghost proceeds from the Father alone.

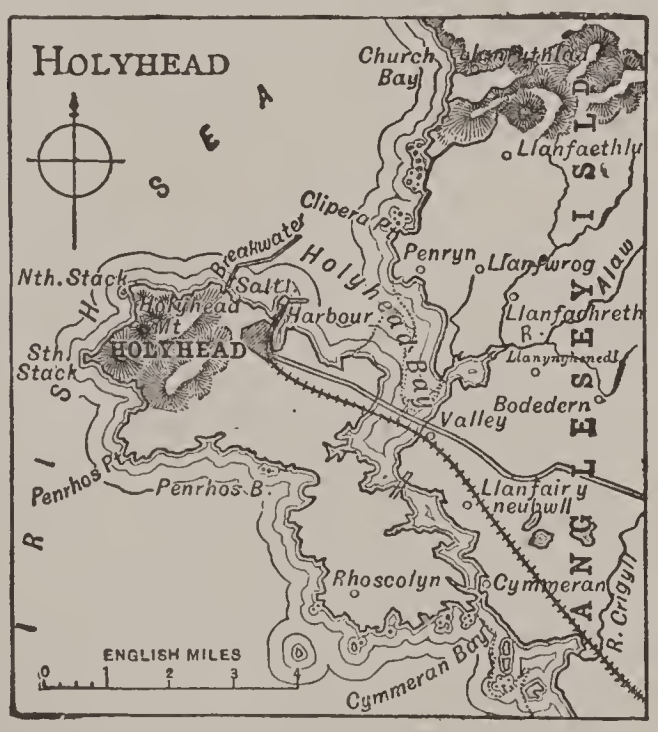
Holy Ghost, Order of, an order of male and female hospitallers, founded by Guy, son of William, Count of Montpellier, towards the end of the twelfth century, for the relief of the poor, the infirm and foundlings. After the middle of the eighteenth century it was united with the order of St. Lazarus by Clement XIII. This was also the

name of the principal military order in France instituted in 1578 by Henry III, abolished in 1789, revived at the Restoration, and again abolished in 1830.

Holy Grail. See *Grail.*

Holy Grass, *Hierochlŏe*, an odoriferous genus of grasses belonging to the Phalarideæ, and consisting of several species spread over the cold parts of both hemispheres. The *H. borealis*, or northern holy grass, is found in Scotland, Iceland, and throughout Northern Europe, Asia and America, and occurs also in New Zealand. It has its name from the practice adopted in some parts of Germany of strewing it before the doors of churches on festival days.

Holyhead (hol'i-hed), an island and seaport town of North Wales, in the county of Anglesey. The island is about 7 miles long and 5 miles broad at the widest part, is situated off



the west side of Anglesey, and is connected with the mainland by a causeway. The town is on the northeast side of the island, and owes its prosperity to the railway and steamboat traffic between England and Dublin. The harbor of refuge (Victoria Harbor), opened in 1873, is formed by a breakwater which is 7860 feet in length. Ropemaking and shipbuilding are leading industries. Pop. 10,638.

Holy Island, or LINDISFARNE, an island off the northeast coast of England, 11 miles southeast of Berwick. It is 1¾ miles from the mainland, with which it is connected by a narrow neck of sand, traversable at low water. It is of an irregular form, about 2¼ miles in length, and about 1½ miles in breadth at the broadest part. The village of Lindisfarne on the S. W. is much resorted to by summer visitors, but the great object of interest is the extensive ruined abbey of Lindisfarne, founded in 635 by Oswald, king of Northumbria, destroyed by the Danes, and restored by the Normans in 1082. The castle, on a rock 90 feet high, also dates from an early period.

Holy Land. See *Palestine.*

Holy Maid of Kent. See *Barton, Elizabeth.*

Holy Office. See *Inquisition.*

Holyoke (hōl'yōk), a city of Hampden county, Massachusetts, on the W. bank of the Connecticut River, 8 miles N. of Springfield. It is a prosperous manufacturing place, its rise dating from 1849, when a dam constructed across the river, which here falls 60 feet in the course of a mile, supplied it with extensive water power. It is extensively engaged in the manufacture of woolen and cotton goods, paper, cutlery, machinery and various other articles. Its paper industry is one of the largest in the world, and the textile works are very large. Pop. 57,730.

Holy Orders. See *Orders, Holy.*

Holy Places of Jerusalem, a term meant to apply more particularly to that group of localities of which the Church of the Holy Sepulchre is the center, some of the other more celebrated objects being the Garden of Gethsemane, the Church of the Ascension, the Tomb of the Virgin, etc., all connected with the life and passion of our Saviour. The guardianship of the holy places has been a cause of much contention between the Greek and Latin churches. They were formerly under the control of the latter, but since 1757 they have been committed to the care of the Greek Church by imperial ordinance of the Porte. Demands made respecting the holy places and the protection of Greek Christians in Turkey, led to the Crimean war of 1854-56.

Holy Roman Empire, a title which the German Empire received in 962 when Otho I was crowned at Rome by Pope John XII. It came to an end when Francis II became hereditary emperor of Austria in 1804.

Holyrood (hol'i-röd), PALACE AND ABBEY OF, in Edinburgh, at the eastern extremity of the old town. The abbey church, founded in 1128 by

David I, containing the royal vault, with the ashes of numerous members of the Scottish royal race, is now mostly in ruin. The palace is a large quadrangular building of hewn stone, with a court within surrounded by a piazza. It was erected in successive parts from 1501 to 1679, contains the private royal apartments in modernized condition, the rooms associated with the events in the reign of Mary, Queen of Scots, and a gallery 150 feet long, in which are portraits of all the Scottish kings, most of them imaginary. The abbey and its precincts possess the privilege of sanctuary for insolvent debtors, but the class of debtors entitled to sanctuary has been so restricted by recent legislation that the institution may be looked upon as obsolete.

Holy Sepulcher, KNIGHTS OF THE, an order of knighthood founded by Godfrey of Bouillon, 1099, for the guardianship of the Holy Sepulcher at Jerusalem, and for the protection of pilgrims. It was revived by Pope Alexander VI, 1496, and reorganized in 1847 and 1868.

Holy Spirit Plant, an orchidaceous plant (*Peristeria clata*) of Central America, known also as the *dove-plant*, from the resemblance of the united stamens and pistil of the flower to a dove hovering with expanded wings, somewhat like the conventional dove seen in artistic representations of the Holy Ghost. It has a spike of almost globose, sweet-scented flowers of a creamy white, dotted with lilac on the base of the lip.

Holy Thursday, Ascension-day, in the Anglican Church, a movable feast, always falling on the Thursday but one before Whitsuntide. In the Roman Catholic Church, the Thursday in Holy Week. See *Holy Week*.

Holy Wars. See *Crusades*.

Holy Water, in the Greek and Roman Catholic churches, salted water which has been consecrated by prayers, exorcism, and other ceremonies, to sprinkle the faithful and things used for the church. It is placed at the door of churches, so that worshipers may sprinkle themselves with it as they enter, and it is used in nearly every blessing which the church gives. Sprinkling the people with holy water seems to date from the ninth century, and it is considered efficacious not from any virtue of its own, but from the effect of the church's prayers at the time of using.

Holy Week, or PASSION WEEK, is that which immediately precedes Easter, and is devoted especially to commemorate the passion of our Lord. The days more especially solemnized during it are Spy Wednesday, Maundy Thursday, Good Friday and Holy Saturday. It is an institution of very early origin, and is known as Great Week, Silent Week, Penitential Week, etc. Spy Wednesday was a name given in allusion to the betrayal of Christ by Judas Iscariot. Maundy or Holy Thursday especially commemorates the institution of the Eucharist.

Holywell (hol'i-wel), parliamentary borough, Flintshire, North Wales, on the estuary of the Dee, 17 miles S. W. Liverpool. It takes its name from the well of St. Winifred, one of the most copious springs in Britain, long a famous resort for the supernatural cure of bodily disease and infirmity. The well is covered by a small Gothic building of early date. It formerly sent up 20 tons of water a minute, but its flow has decreased. Near the town are coal and lead mines, quarries, etc. Pop. 2549.

Homage (hom'ij), in feudal law, a formal acknowledgment made by a feudal tenant to and in presence of his lord on receiving the investiture of a fief or coming to it by succession, that he was his vassal. The tenant, being ungirt and uncovered, kneeled and held up both his hands betweeen those of the lord, who sat before him, and there professed that 'he did become his man, from that day forth, of life and limb, and earthly honor,' and then received a kiss from his lord.

Homburg (hom'burg), a town of Prussia, province of Hesse-Nassau, 9 miles N. N. W. Frankfort. It is well and regularly built, and is much frequented on account of the mineral springs and bathing establishment, to which gaming-tables were formerly attached. The waters are of two classes, those of three springs being purgative, and used for complaints of the stomach, liver, kidneys, etc.; those of the remaining two containing iron and being used as a tonic. Pop. (1905) 13,740.

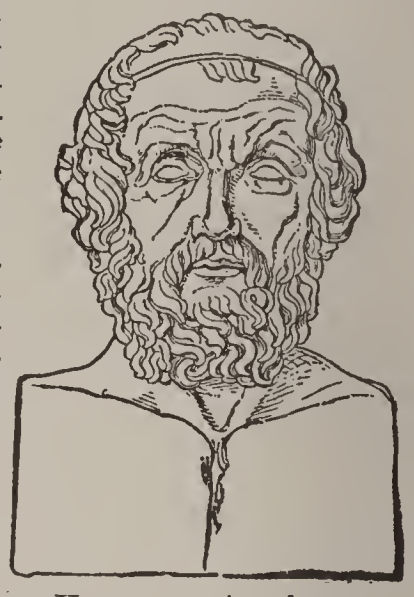
Home (hōm), DANIEL DOUGLAS, spiritualist, born near Edinburgh in 1833; died in 1886. He was brought when young to the United States, and as a youth became famous for his mediumistic powers. In 1855 he removed to Europe, where his remarkable manifestations excited great attention. He was especially notable from having convinced Sir William Crookes, the famous physicist, of the truth of spiritualism.

Home, Henry, a Scottish lawyer and author, born in 1696; died in 1782. He studied law at Edinburgh, and was called to the bar in 1724. He soon acquired reputation by a number of publications on the civil and Scottish law. In 1752 he became a judge of session, and assumed the title of Lord Kames. In addition to his legal works he published *Essays on British Antiquities; Essays on the Principles of Morality and Natural Religion*, in which he advocates the doctrine of philosophical necessity; *Introduction to the Art of Thinking;* and his best-known work, *Elements of Criticism*, in which, discarding all arbitrary rules of literary composition, he endeavors to establish a new theory on the principles of human nature. In 1776 he published the *Gentleman Farmer;* and in 1781 *Loose Thoughts on Education.*

Home, John, a Scottish clergyman and dramatic poet, born at Leith in 1722; died at Edinburgh in 1808. He studied for the church, and was appointed to the parish of Athelstaneford, vacant by the death of Blair, author of the Grave. His tragedy of *Douglas* was performed at Edinburgh in 1756, and attained a wonderful popularity, which has not yet altogether disappeared. The production gave great offense to the church as a body; the author was threatened with ecclesiastical censures, and in consequence resigned his living, and ever after acted and appeared as a layman. He retired into England, obtained the protection of the Earl of Bute, and received a considerable pension. His other plays, the *Siege of Aquileia*, the *Fatal Discovery*, *Alonzo*, and *Alfred*, are absolutely forgotten, a fate which their mediocrity deserves. His *History of the Rebellion of 1745-46* also disappointed public expectation.

Home Department, that department of the executive government of Britain in which the interior affairs of the country are regulated. It is analogous to the ministry of the interior of other countries; its headquarters is the home office, and its chief is the home secretary.

Homer (hō'mėr; Greek, *Homēros*), an ancient Greek epic poet of whom nothing is known with certainty, some even doubting whether he ever existed. The most probable opinion is that he was a native of some locality on the sea-board of Asia Minor, and that he flourished between 950 and 850 B.C. The earliest mention of the name of Homer is found in Xenophanes (sixth century B. C.) The common statement that he was blind may safely be discarded. The poems that have been generally attributed to Homer are the *Iliad* and *Odyssey*. The *Batrachomyomachia*, or *Battle of the Frogs and Mice*, and certain hymns to the gods also passed under his name, though belonging to a later period. The *Iliad* in its present form consists of twenty-four books, and tells the story of the siege of Troy from the quarrel of Achilles with Agamemnon to the burial of Hector, with subordinate episodes. The *Odyssey* is also in twenty-four books, and records the adventures of Odysseus (Ulysses) on his return voyage to his home in Ithaca after the fall of Troy. Even as early as the beginning of the Christian era, certain Greek critics (the Separatists) maintained that the two poems were the work of different poets, but the general belief continued to be that there was one author for both. The entire system of Homeric criticism, however, was revolutionized in 1795 by F. A. Wolf in his *Prolegomena to Homer*. He asserted that the *Iliad* and *Odyssey* were not originally committed to writing, and were not two complete and independent poems, but originally a series of songs of different poets (Homer and others), celebrating single exploits of heroes, and first connected as wholes by Pisistratus, about 540 B.C. Some of Wolf's arguments have been proved erroneous, but since his time the old views in regard to the *Iliad* and *Odyssey* have been held by comparatively few of the ablest scholars, though what theory is now the most common is difficult to say. Among the most conservative theories is that which assigns to Homer a central or basal portion of both *Iliad* and *Odyssey*, to which additions by other poets were gradually united; but generally the *Odyssey* is regarded as of somewhat later date than the *Iliad*, and not by the poet who produced the *Iliad* in its original form.



Homer—ancient bust.

Homer, Winslow, painter, born at Boston, Massachusetts, in 1831. He studied lithography, then began to draw on wood for engravers, and in 1859 established himself in New York,

A STEEL MANUFACTURING TOWN

Homestead, Pennsylvania, one of the greatest steel centers in the world.

where he became a newspaper artist and correspondent. His war pictures were highly esteemed, especially his *Prisoners at the Front.* He died in 1910.

Home Rule, in British politics, a measure which has been very actively advocated in regard to Ireland. The leading feature of the Irish Home Rule party seems to be the establishment of a native parliament in Ireland to conduct all local and internal legislation, leaving the general political government of the empire to an imperial parliament. The movement originated in the formation of the Home Government Association at Dublin, in 1870, under the presidency of Mr. Isaac Butt. At the general election of 1874 the party succeeded in sending 60 Home Rule members to parliament for Irish constituencies. The elections of 1885 and 1886 still further strengthened the party, 86 members following the lead of Mr. Parnell (which see). The original scheme has been materially modified since Butt's time, and there are not wanting Irishmen who declare openly for absolute independence, which many believe to be the ultimate aim of the whole party. The conversion of Mr. Gladstone and many members of the Liberal party to Home Rule principles added immense strength to the movement. In 1893 a Home Rule bill was passed by the Commons, but defeated by the Lords. At the present time the leaders of the movement have a strong influence in parliament, and are very hopeful of success. See also *Land League.*

Home-sickness, in medicine, *Nostalgia,* a disease arising from an intense and uncontrolled feeling of grief at a separation from one's home or native land. It is most frequent among persons who leave mountainous and go to flat countries, as the Scotch Highlanders and Swiss, or among those who change from the country to the town. It commences by a deep melancholy, and sometimes terminates fatally.

Homestead (hōm'sted), a manufacturing town of Allegheny county, Pennsylvania, 7 miles S. E. of Pittsburgh. It has extensive manufactures of armor-plate, fire-bricks, etc., the steel works giving employment to a large number of men. A serious labor outbreak took place here in 1892, attracting wide attention and ending in the loss of several lives. Pop. 18,713.

Homestead Laws, laws enacted in the United States by Congress or by State legislatures with a view to securing to families the possession of a home and land. Under these laws any citizen, or person who declares an intention to become a citizen, male or female, 21 years old, may become the possessor of a homestead of 80 or 160 acres, by occupation and cultivation, to be taken from unreserved public lands. A fee of $5 or $10 is required to be paid on filing affidavit of settlement, citizenship, age, etc. The total fee is from $26 to $34, according to the district of settlement. Five years' residence and cultivation are required, but only three are demanded where 5 or 10 acres of forest trees have been cultivated. Ex-Union veterans or their heirs may obtain a patent one year after residence. Benefits are limited to one claim, except that veterans who have made one land settlement may also take a homestead claim. Under timber culture provisions homestead locators may secure another 160 acres, including timber area, by cultivating 40 acres of trees. A homestead is free from debt liability before patent issues and a locator may, on proof of settlement six months after occupancy, buy said land at preëmption price. A general land-office, forming a bureau of the Interior Department, is in charge of land administration. Each State has a surveyor-general, and each congressional district a land-office. The public lands are divided into 'hundreds,' 10 miles square; these into 'sections,' 1 mile square, and these into quarters of 160 acres and eighths of 80 acres.

Homicide (hom'i-sīd), the killing of one man or human being by another. In law, homicide is of three kinds—*justifiable, excusable,* and *felonious—justifiable,* when it proceeds from unavoidable necessity, as where the proper officer inflicts capital punishment, where an officer of justice kills an offender who assaults or resists him and who cannot otherwise be captured, or where persons are killed in the dispersion of rebellious or riotous assemblies; *excusable,* when it happens from misadventure, as where a man in doing a lawful act by accident kills another, or in self-defense, as where a man kills another in defense of the life of himself, his wife, children, parent, servant, etc.; *felonious,* when it proceeds from malice, or is done in the prosecution of some unlawful act, or in a sudden passion. Self-murder also is felonious homicide. Felonious homicide comprehends murder and manslaughter.

Homiletics (hom-i-let'iks), the art of preaching; that branch of practical theology which teaches the principles of adapting the discourses of the pulpit to the spiritual benefit of the hearers, and the best methods which

for instructing their hearers by their doctrines and example. Increased attention has been drawn to homiletics by Lyman Beecher of Yale.

Homily (hom'i-li), a discourse or sermon read or pronounced to an audience on some subject of religion; a discourse pronounced in the church by the minister to the congregation. The ancient homily was sometimes simply a conversation, the prelate talking to the people and interrogating them, and they in turn talking to and interrogating him. In modern use a homily differs but little from an ordinary sermon, the idea of simplicity, however, being always attached to it. The earliest existing examples of the homily are those of Origen in the third century. In the schools of Alexandria and Antioch this form of discourse was sedulously cultivated, and Clement of Alexandria, St. Dionysius, and Gregory Thaumaturgus are among the names most eminent in this department. It was in later centuries, however, and in the hands of Athanasius, Gregory of Nyssa, and Gregory of Nazianzus, Basil, Cyril of Jerusalem, and Cyril of Alexandria, and especially of Chrysostom that the homily reached its highest excellence. Augustine and Gregory the Great were among the western composers of homilies. In the Church of England, after the Reformation, two official books of homilies were issued. These were called *The First and Second Books of Homilies*, and the former, ascribed to Cranmer, appeared in 1537; the latter, said to be by Jewell, in 1563. They were originally meant to be read by those of the inferior clergy who were not qualified to compose discourses themselves.

Homing Pigeon. See *Carrier Pigeon.*

Homocercal (h o - m u - s ėr'kal; Gr. *homos*, same, *kerkōs*, tail), a term applied in the case of fishes which have tails with rays diverging symmetrically from the backbone, as opposed to *heterocercal.*

Homocercal Tail.

Homœopathy (hō-mē-op'a-thi), the name of a system of medicine introduced by Samuel Hahnemann, of Leipzig (died 1843). It is founded upon the belief that drugs have the power of curing morbid conditions similar to those they have the power to excite, an old belief of Hippocrates long ago expressed in the Latin phrase *similia similibus curantur* ('like is cured by like'). In contradistinction to this system the more common method of treating diseases was termed by him *heteropathy* or *allopathy.* In practice homœpathy formerly was associated with the system of administering infinitesimal doses, though this practice has been modified within recent years and larger doses are given. The system of homœopathy in Europe, and especially in Britain, has been bitterly opposed by the older school of medicine, though the antagonism has mitigated within recent years. In the United States homœopathy met with less opposition and had a considerable development, numerous medical colleges, hospitals, etc., being established for the study and practice of this system. The number of these institutions, however, is greatly exceeded by those of the regular school, and their pupils have considerably decreased in number during the last decade.

Homoiousians (h o m-oi-ö'si-anz), a sect of Arians, followers of Eusebius, who maintained that the nature of Christ is not the same with, but only similar to (Gr. *homoios*, like), that of the Father, as distinguished from the Homoousians, who maintained that he was of the same nature. See *Homoousians.*

Homologous (hom-ol'o-gus), (1) in g e ometry, corresponding in relative position and proportion. (2) In physiology, corresponding in type of structure; thus, the human arm, the foreleg of a horse, the wing of a bird, and the swimming-paddle of a dolphin or whale, being all composed essentially of the same structural elements, are said to be homologous, though they are adapted for quite different functions. See *Analogue.*

Homoousians (h o - mō-ö'si-anz; Gr. *homos.* same, *ousia*, being, nature), the orthodox party in the church during the great controversy upon the nature of Christ in the fourth century, who maintained that the nature of the Father and the Son is the same, in opposition to the *Homoiousians*, who held that their natures were only similar. See *Homoiousians.*

Homoptera (hom-op'tėr-a), one of the sections into which the order of hemipterous insects has been

Homoptera—*Cicada Diardi.*

divided, the other section being the Heteroptera. The insects of this section have the wing-covers generally deflexed, of the

same consistence throughout, the antennæ mostly short and terminated by a bristle, and the body convex and thick. To this section belong the aphides, cicadas, lantern-flies, etc.

Homs (hōmz). See *Hems*.

Honan (hō′nän′), a once populous city of China, in the province of same name, on an affluent of the Hoang-ho. The province has an area of 65,104 square miles. It is generally level, and is watered by the Hoang-ho and its affluents. The soil is fertile and carefully cultivated; the forests in the west supply timber; and mines yield tutenag or Chinese copper, cinnabar, mica, etc. Honan suffered severely from the inundation of the Hoang-ho in 1887; capital, Kai-fung. Pop. about 22,000,000.

Honawar (hō-nä-wur′), seaport and chief town of subdivision of the same name, Bombay, on an estuary into which the Gersoppa river falls. It has an important and growing coasting trade. Pop. 6929.

Hondo (hon′dō), the name given by the Japanese to the chief island in their empire. In many geographical works Nippon or Niphon is the distinctive appellation of this island, but by the Japanese themselves that name is applied to the whole country. The area of the island is 87,425 sq. miles, and the population 33,327,935. See *Japan*.

Honduras (hon-dö′ras), a republic of Central America; area, 46,400 square miles, bounded N. by the Caribbean Sea and the Gulf of Honduras, W. by Guatemala, S. W. by Salvador and the Bay of Fonseca on the Pacific, and S. E. by Nicaragua, the coast line being about 350 miles in length. Its surface is hilly, with numerous fertile valleys. Its mineral wealth is very considerable, and includes gold, silver, lead and copper, the copper deposits being very rich. The chief rivers are the Chamelicon, Ulua, and Aguan, flowing to the Caribbean Sea, and the Choluteca, an affluent of the Pacific. There are extensive forests abounding in fine timber, including mahogany and rosewood, with dye-woods, copal, rubber, etc. The cultivated productions include maize, beans, some wheat, rice, plantains and tobacco. The banana is widely cultivated, sugar-cane yields two or three crops a year, the coffee is of excellent quality and sarsaparilla and vanilla of the best quality are grown. Since 1880 the capital has been Tegucigalpa; the principal ports are Truxillo on the Caribbean Sea, and Port San Lorenzo, on the Pacific. The constitution of Honduras gives the legislative power to a congress of deputies composed of thirty-seven members. The executive authority is in the hands of the President. Reciprocity of trade with the United States was established April 30, 1892. Pop. about 600,000.

Honduras, Bay of, a wide inlet of the Caribbean Sea, having on the south Guatemala and Honduras, and on the west British Honduras and Yucatan. Along its shores are the islands of Bonaca, Ruatan, Utila, Turneff, and numerous islets and reefs called cays.

Honduras, British, or Belize, a British colony of Central America, having north and west, Yucatan; west and south, Guatemala; and east, the Bay of Honduras. Area, 7,562 sq. miles. The coast is generally low and swampy, but the land rises towards the interior, and in some parts may be called mountainous. The mountains, and the wide valleys between them, are covered with extensive forests of the finest timber, including cedars, pines, ironwood, logwood, braziletto, mahogany, etc. Sugar-cane, coffee, bananas, cocoanut, tobacco, etc., are cultivated; and the exports include mahogany, logwood, bananas, and other fruits. The climate is fairly healthy. Since 1884 the government has been administered as in a crown colony under the presidency of a governor. The capital is Belize or Balize. Honduras was transferred by Spain to England by treaty in 1670, but at different times its occupation was contested by the Spaniards till 1783, since which period it has remained quietly in the possession of Great Britain. The population is composed chiefly of negroes and Caribs from the West Indies, who were first brought to the country as slaves. Pop. 31,471, including about 400 whites.

Hone (hōn), the name given to several varieties of slaty stones employed in whetting knives, razors, or other edge-tools. They are usually pieces of hard, close-grained clay-slate, containing minute particles of quartz, with a uniform consistence. Best of all varieties is the Turkey oil-stone, and next in esteem are the Arkansas oil-stones. Others of value are the German and Scotch hones, and the Canada oil-stones.

Hone, William, an English antiquary, born in 1780; died in 1842. He began life in a law-office, and became imbued with freethinking opinions. In 1800 he abandoned the law and made ventures as a writer, bookseller and publisher, which were all failures. In 1817 he was prosecuted by government for the publication of alleged irreverent

parodies and lampoons, when he defended himself with great acuteness, and was acquitted. He subsequently had a large sum subscribed for him as a champion of the freedom of the press. He gradually abandoned freethought and the writing of satires for religion and antiquarianism. His chief publications are the *Every-day Book* (1826), *Table-book* (1827-28), and *Year-book* (1829), perfect mines of antiquarian lore.

Honey (hun'i), a vegetable product with saccharine properties, collected by bees from the blossoms of flowers, and deposited in the cells of their combs. The best is clear and transparent, and solidifies when kept for some time into a granular, white mass. Some varieties of it are dark yellow or brownish in color. Spring honey is more esteemed than summer honey; and the latter more than that of autumn. *Virgin* honey is taken from hives in which the bees have never swarmed, and it is of a white color. *Yellow* honey is extracted from all sorts of combs. The flavor of honey largely depends on the plants from which it is collected. Honey is obtained in large quantities in many countries, partly from wild bees, but chiefly from those kept in hives. In addition to its ordinary domestic uses, it is employed medicinally as a promoter of expectoration, to sweeten certain medicines, to make a gargle with vinegar, etc. The ancients used it as we do sugar, and made of it and wine a mixture which they very much liked. They also used it in making mead, a fermented liquor made of honey and water. See *Honey-comb*.

Honey-ant, an ant (*Myrmecocyctus mexicanus*) inhabiting Mexico, and living in communities in subterranean galleries. In summer a certain number of these insects secrete a kind of honey in their abdomens which become so distended as to appear like small pellucid grapes. When food is scarce these ants feed the others from their store of honey. They are also dug up and eaten by the inhabitants of the country.

Honey-badger. See *Ratel.*

Honey Bear, a name of the kinkajou.

Honey-buzzard. See *Buzzard.*

Honey-comb, a waxen cellular structure framed by bees in which to deposit their honey and eggs. The wax is secreted by the insect in the form of small and thin oval scales in the folds of the abdomen. The comb is composed of a number of cells, most of them exactly hexagonal, and arranged in two layers placed end to end, the openings of the layers being in opposite directions. The comb is placed vertically, the cells being therefore horizontal. The sides of the cells are very thin, and yet the whole structure is of considerable strength. Some cells are destined for the exclusive reception of honey; others for the reception of larvæ.

Honey-dew, a liquid saccharine substance found on the leaves of trees and other plants in small drops like dew. There are two kinds; one secreted from the plants, and the other deposited by aphides. Different kinds of manna are the dried honey-dew or saccharine exudations of certain plants. See *Manna.*

Honey-eater, the name given to a number of insessorial birds forming the family of Meliphagidæ, of the tribe Tenuirostres. They form a

Wattled Honey-eater (*Anthochæra mellivŏra*).

numerous group, feeding principally on honey and the nectar of flowers. They are natives of Australia and the adjacent islands. They have long curved sharp bills, with tongues terminating in a pencil of delicate filaments, to enable them the better to extract the juices of flowers.

Honey-guide, a name given to the cuckoos of the genus *Indicator*, which by their motions and cries conduct persons to the nests of wild honey-bees. They are natives of South Africa.

Honey-locust, Sweet Locust, or Black Locust (*Gleditschia triacanthos*), a forest tree belonging to the United States, natural order Leguminosæ. The leaves are pinnated, divided into numerous small leaflets, and the foliage has a light and elegant appearance; the flowers are greenish, and are succeeded by long, often twisted pods, containing large brown

HONGKONG HARBOR

seeds, enveloped in a sweet pulp. This tree is especially remarkable for its formidable thorns, on which account it has been recommended for hedges. The *G. monosperma*, a tree resembling the last in general appearance, grows in swamps in Illinois and southwestward. The wood is inferior in quality.

Honey-stone. See *Mellite.*

Honey-suckers. Same as *Honey-eaters.*

Honeysuckle, or WOODBINE, genus *Lonicēra* of Linnæus, natural order Caprifoliaceæ. *L. periclymĕnum*, a twining shrub, with distinct leaves and red berries, is indigenous in Great Britain; but two others have been naturalized, *L. caprifolium*, distinguished by its upper leaves being united in a cup; and *L. xylosteum*, with small, yellowish, scentless flowers, and scarlet berries. *L. sempervirens* (trumpet-honeysuckle) is also cultivated in Britain on account of the beauty of its flowers. The honeysuckle family is represented in North America by nine different species. *Australian honeysuckle* is a name given to *Banksia australis* and other species of the Protea family, from their flowers being filled with a sweet liquid.

Honfleur (oṅ-fleur), a seaport of France, department of Calvados, on the estuary of the Seine. It was a poorly-built place, but has lately been much improved. The rise of Havre has injured its commerce, but it still has a trade in agricultural and dairy produce, some manufactures in connection with shipping, fisheries, etc. On the hill above the town is the chapel of Nôtre Dame de Grace, much frequented by sailors, and filled with their votive offerings. Honfleur was long in possession of the English, and makes a considerable figure in the history of their French wars. Pop. 8853.

Hong-Kong (hong-kong′), an island off the S. E. coast of China, belonging to the British, at the mouth of the estuary that leads to Canton, from which it is distant 90 miles. It is about 10 miles in extreme length, and 7½ miles in extreme breadth, separated from the mainland by a narrow strait, and with Cowloon on the mainland forms a crown colony, area 32 sq. miles. The island consists almost entirely of barren rocks, which rise to heights of 1000 to 2000 feet, and is almost destitute of vegetation. Good water, however, is abundant. On the north side of the island, on a splendid harbor, is Victoria, the chief town of the island and center of its commerce. It is well laid out with handsome streets, and has a cathedral, a bishop's palace, a government house, courthouse, etc., while handsome residences of the merchants are scattered about the town and its suburbs. Hong-Kong is a great entrepôt for the foreign commerce of China, and is a free port without customs' dues. It is also a station of the British fleet. The revenue of the government is derived from the land rents, licenses to sell opium, spirits, etc., taxes, postages, fines, fees of office, etc. The prosperity of the colony is chiefly owing to the presence of large numbers of Chinese, engaged in trade or in working the building-stone, which is one of the principal products of the island. The foreign commerce is mainly carried on with Great Britain. The currency consists chiefly in dollars coined in England, value about 4*s.* 2*d.* each. Hong-Kong was ceded to Britain by the Treaty of Nan-King in 1842. The population is 327,000, of which number 306,000 are Chinese.

Honiton (hon′i-tun), a town of England, in Devonshire, on the Otter, long celebrated for the manufacture of a special variety of lace. Pop. 3271.

Honolulu (hō-nō-lö′lö), a city, the capital and principal port of the Hawaiian Islands, on the south side of the Island of Oahu. The city is well laid out, with fine public squares, clean streets, and tropical gardens, the climate being pleasant and healthful. It contains extensive and handsome government buildings, the palace of the former kings, museum, theater, library, churches, etc., and has street railways and electric lights. Newspapers and magazines are published in the Hawaiian, Japanese, Chinese, and several European languages. At the wharves are landing facilities for the largest vessels, and there are steamship lines to various American and foreign ports. There are foundries, shipyards, and manufacturers of iron, carriages, ice, etc. Pop. 39,306.

Honorius (ho-no′ri-us), FLAVIUS, son of Theodosius the Great, born 384 A.D.; died 423. After the division of the empire, A.D. 395, Honorius received the western half, but, on account of his youth, Stilicho was appointed his guardian. The principal events of his reign are the adoption of rigorous measures against paganism in 399; the invasion by Alaric in 400-403; another irruption of barbarians under Rhadagaisus, 405-406. Both invasions were repelled by Stilicho, who was assassinated at Ravenna in 408. Alaric marched on Rome and plundered it in

409, while Honorius shut himself up in Ravenna. Some of the finest provinces of the empire, Spain, Gaul, and Pannonia, were lost in this reign.

Honor (on'ur), in law, is a seignory consisting of several manors held under one baron or lord-paramount.

Honor, Maids of, ladies in the service of an European queen who attend their mistress when she appears in public. In England they are eight in number.

Honorable (on'ur-a-bl), Right Honorable and Most Honorable, titles given in the United Kingdom to peers, their families, and certain public functionaries. (See *Address, Forms of.*) In America the governors of States, judges, members of Congress, and others holding offices of dignity and trust, are styled honorable.

Honors of War, are stipulated terms granted to a garrison surrendering, in consideration of a brave defence, etc. Sometimes the vanquished are allowed to march out with their arms, drums beating and colors flying; or they may be permitted to deposit their arms and stores at a certain spot, and return to their own country on parole.

Honvéd (hon'ved), the name applied to the Hungarian militia.

Hoobly (hö'bli), or Hubli, a town of India in Dhárwár district, Bombay Presidency, a great center of the cotton trade. Pop. 60,214.

Hooch, or Hoogh (hō*h*), Pieter de, one of the best Dutch painters in genre, born in 1630; died about 1681. He was peculiarly successful in depicting scenes, illuminated by sunlight, of Dutch domestic life. Many of his finest works are in British galleries.

Hood, John D., general, born in Bath County, Kentucky, in 1831; died in 1879. He graduated at West Point in 1853, joined the Confederate army in the Civil war, commanded a division of Lee's army at Antietam and at Gettysburg, and lost a leg at Chickamauga. Commissioned lieutenant-general, he succeeded Johnston in command of the army opposing Sherman in 1864. He was defeated by Sherman in two battles, was forced to abandon Atlanta, and afterwards invaded Tennessee, and besieged Nashville. Here he was completely defeated by General Thomas, and was relieved of his command in January, 1865.

Hood, Robin, a celebrated outlaw who, according to the popular account, with his followers, inhabited Sherwood Forest, in Nottinghamshire, and also the woodlands of Barnsdale in the adjoining West Riding. They supported themselves by levying toll on the wealthy, and more especially on ecclesiastics, and by hunting the deer of the forest. The famous members of his band were his lieutenant, Little John; his chaplain, Friar Tuck: William Scadlock, George-a-Greene, Much, the miller's son, and Maid Marian. It is stated that he was born in 1160. His death is said to have occurred in 1247, in consequence of the treachery of the prioress of Kirklees, who opened an artery by which he bled to death. His skill with the long-bow and quarter-staff was celebrated in tradition. What basis of fact there is for the story of Robin Hood is doubtful. Grimm maintained that he was one with the Teutonic god Woden. Other theories suppose him to have been a rebel yeoman in Lancaster's rebellion under Edward II; a Saxon chief who defied the Normans; and a fugitive follower of Sir Simon de Montfort after the battle of Evesham.

Hood, Samuel, Viscount, a British admiral, born 1724; died 1816. He joined the navy as a midshipman in 1740, and attained the rank of post-captain in 1759. Having become rear-admiral, he preserved the island of St. Christopher's from being taken by De Grasse, assisted in the defeat of De Grasse by Rodney in 1782, and was rewarded with the title of Baron Hood of Catherington in the Irish peerage. In 1793 he commanded against the French in the Mediterranean, and captured Toulon and Corsica. In 1796 he was made an English peer, with the title of Viscount Hood.—Alexander, Viscount Bridport, brother of the preceding, was also an admiral. He commanded under Lord Howe in the Channel fleet in 1794;

Viscount Hood.

defeated the French off L'Orient, 1795; was created Viscount Bridport, 1801; died 1814.—Sir Samuel, cousin of the above, born 1762; died 1815, was present at the battle of the Nile, 1798; captured Tobago and the Dutch settlements in Guiana, 1803; and defeated the French squadron off Rochefort in 1806.

Hood, Thomas, an English poet and humorist, of Scotch extraction, born at London in 1798; died in 1845. During a residence at Dundee, and while only fifteen or sixteen years of age, he contributed articles to a local paper and magazine. In 1821 he became subeditor of the *London Magazine*, and in 1826 appeared his *Whims and Oddities*, which was followed by *National Tales* and a volume of serious poetry. From 1829 to 1837 he conducted a *Comic Annual*. At the same time his pen was employed on other subjects, and he published *The Epping Hunt*, a comic poem, ridiculing Cockney sportsmen; *Eugene Aram's Dream*, inserted in the *Gem*, of which he was for a short time editor; and *Tylney Hall*, a novel. In 1837, on the termination of the *Comic Annual*, he commenced a monthly periodical entitled *Hood's Own*, which consisted chiefly of selections from the former work. His health now began to fail, and with a view to its recovery he paid a visit to the Continent. While there in 1839 he published his *Up the Rhine*, which, based on the lines of Humphrey Clinker, was very popular. Shortly after his return he undertook the editorship of the *New Monthly Magazine*, and continued it till 1843. His principal contributions to it he published separately, under the title of *Whimsicalities*. His last periodical, entitled *Hood's Magazine*, was commenced in 1844; but his health shortly afterwards completely broke down, and his death occurred in the following year. It was during his last illness that he contributed to *Punch*, *The Song of a Shirt*, *The Bridge of Sighs*, and *The Lay of a Laborer*. Hood is unrivaled as a punster, and he possesses a singular power of combining the humorous with the pathetic. He had the satisfaction of knowing that the pension of £100 conferred upon him during his last illness by Sir Robert Peel was to be transferred to his wife.

Hood, Tom, son of the great humorist, and a miscellaneous writer, born in 1835; died in 1874. He studied at Oxford, and during his residence there he wrote *Pen and Pencil Pictures*. In 1861 appeared his *Daughters of King Daker, and other Poems*. In 1865 he became editor of *Fun*, which became very popular under his management. His talents, although similar to those of his father, were less brilliant.

Hooded Crow. See *Crow*.

Hooded Seal (*Cystophŏra cristāta*), a species of seal, the male of which possesses a movable inflatable muscular bag, stretching from the muzzle to about five inches behind the eyes. The prevailing color is bluish black—the head and limbs being uniformly black. Its usual range extends in America southwards to Newfoundland, and in Europe to Southern Norway.

Hooded Snake. See *Cobra de Capello*.

Hoofs, the horny tissues which constitute the external part of the feet of certain animals, mostly herbivorous. They may be regarded as homologues of the toe-nails of other animals. They are composed of epithelium cells, agglutinated and dried, and of intercellular substance and cell contents. Chemically they consist of keratin.

Hooghly River. See *Hugli*.

Hook, Theodore Edward, novelist and journalist, born at London in 1788; died in 1841; was the son of James Hook, a musical composer. After leaving Harrow he employed himself in composing the farce of *The Soldier's Return*, instead of reading for Oxford. For some years Hook led a life of gaiety in London, and became notorious for practical jokes and similar escapades. In 1812 he was appointed accountant-general and treasurer of the Island of Mauritius; but, owing to his gross carelessness, a large deficiency in the military chest was discovered, and in 1818 he was sent home under arrest, but no proceedings were taken against him. From 1820 to 1841 he was editor of the *John Bull*, and at intervals from 1824 to 1828 he published his *Sayings and Doings*, while in 1836 he became editor of the *New Monthly Magazine*. His other principal works are *Life of Sir David Baird*, and a series of novels, among which may be mentioned *Love and Pride*, *Jack Brag*, *Gilbert Gurney*, *Gurney Married*, *Precepts and Practice*, and *Fathers and Sons*.

Hook, Walter Farquhar, Dean of Chichester, born at London in 1798; died in 1875. In 1821 he graduated at Christ Church, Oxford, was appointed vicar of Leeds in 1837, and promoted to the deanery of Chichester in 1859. He wrote an *Ecclesiastical Biography*, a *Church Dictionary*, *Lives of the Archbishops of Canterbury*, etc.

Hookah. See *Pipe* (*Tobacco*).

Hooke, Nathaniel, an English historian, born about 1690; died 1763. He was a friend of Pope and other literary men. His best-known work is his *Roman History, from the Earliest Period to the Accession of Augustus.*

Hooke, Robert, an English mathematician and natural philosopher, born 1635; died 1703. In 1658-59 he invented the balance spring of watches, an honor otherwise ascribed to Huyghens. He partially anticipated the Newtonian theory of gravitation and the undulatory theory of light.

Hooker (hụk'ẽr), Joseph, general, was born at Hadley, Massachusetts, in 1815. Graduating at West Point in 1837, he served in the Florida and Mexican wars with conspicuous gallantry. At the outbreak of the Civil war he was made brigadier-general of volunteers. He distinguished himself in the several engagements in the Peninsula in 1864, particularly at Malvern Hill, and became known as 'fighting Joe Hooker.' He took part in the subsequent battles of 1862, being wounded at Antietam, and subsequently was commissioned brigadier-general in the regular army, already holding the rank of major-general of volunteers. He commanded a division at Fredericksburg, was given command of the army of the Potomac in January, 1863, and was defeated by Lee and Jackson at Chancellorsville in May. He took part in the battles near Chattanooga, and in the battle of Lookout Mountain he was commander. Later he commanded the army of the Cumberland near Atlanta, Georgia. In 1864 he had charge of the northern department, of the department of the east in 1865, and in 1866 that of the lakes. He died in Garden City, Long Island, in 1879.

Hooker, Sir Joseph Dalton, a British botanist, born in 1817, son of Sir W. J. Hooker. In 1839 he joined the antarctic expedition of the *Erebus* and *Terror* under Sir J. C. Ross, publishing on his return the *Botany of the Antarctic Voyage.* In 1847-51 he traveled in the Himalayas, and his *Himalayan Journals* embody the results of the journey. He and George Bentham (which see) wrote the great work *Genera Plantarum*, published 1862-1883.

Hooker, Richard, a celebrated English divine, born in 1553; died in 1600. In 1579 he was appointed deputy professor of Hebrew; took orders in 1581, and was made preacher at Paul's Cross. His *Ecclesiastical Polity*, published at various dates, and written in defense of the Church of England, is no less remarkable for learning and extent of research than for the richness and purity of its style.

Hooker, Sir William Jackson, a celebrated botanist, father of Sir Joseph Hooker, was born 1785; died 1865. From 1821 to 1841 he was professor of botany at Glasgow University; was knighted in 1836; became director of Kew Gardens in 1841.

Hookworm, a small, worm-like animal, recently found to be the cause of a serious parasitic disease, widespread in its occurrence. The disease was first traced to this worm (a minute form, less than an inch in length) in Italy in 1843. Its action in exhausting the blood was not discovered until 1879, and not until 1902 was the existence of an American variety of the animal demonstrated by Dr. Charles W. Stiles, of the Marine Hospital Service, who indicated the character of the disease by calling it the 'germ of laziness.' The poorer classes of the South had long manifested a peculiar lassitude, with anæmic pallor, and a tendency in many cases to clay eating. This was not known to be a state of disease until Dr. Stiles began his investigations. He traced the worm into the body from the soil, it making its way through the skin of the feet into the circulation, reaching the lungs and from them the respiratory passages and the digestive tract and intestines. Fastening itself to the walls of the bowels, it sucks the blood of the victim. There may be several thousand of these worms in one person, causing considerable loss of blood by sucking and by making minute holes through which the blood oozes into the intestinal tract. It is believed that the hookworm was conveyed to America from Africa by negroes brought in slave ships. It does not seriously affect the negroes, but has been affecting the whites for more than a century, producing a condition unfitting them for energetic labor. Dr. H. F. Harris was the first to recognize the eggs of the hookworm and realize the danger of the disease in this country. In 1902 Dr. Stiles was sent a bottle of the parasites from the South, and found in it a different species from that of Europe. Out of 130 cotton mill operatives he found more than 12 per cent. with the disease. In the sandy districts more than 70 per cent. were infected, and in some localities as many as 90 per cent. The disease is confined in this country to the South, rarely appearing north of the Potomac. Its wide prevalence is attributed to the insanitary habit of blacks and poor whites alike in distrib-

uting their excrement over the soil and in going barefoot, giving the worms in the excrement an opportunity to fasten in the skin of the feet. Fortunately the disease is easily cured by the use of thymol, which kills the worms or forces them to loosen their hold, followed by purgatives, which removes them from the body. By the adoption of suitable sanitary habits this serious affection may be eradicated. John D. Rockefeller, in 1909, contributed $1,000,000 to be used in fighting the disease, and now that its cause and the method of dealing with it are so well known its ravages may be overcome.

Hoole (höl), JOHN, dramatist and translator, born at London in 1727; died in 1803. In 1763 he published a translation of Tasso's *Jerusalem Delivered*, and of six dramas of Metastasio in 1767. His tragedies of *Cyrus*, *Timanthes* and *Cleone* were unsuccessful. In 1773-83 he published separate volumes of his translation of *Orlando Furioso*. In 1792 he translated Tasso's *Rinaldo*, and ended his literary labors with a more complete collection of dramas from Metastasio.

Hoop-ash (*Celtis crassifolia*), an American tree of the order Urticaceæ, found in the forests of Ohio and in the western States. It is a fine tree, attains a height of 80 feet, and is employed for charcoal. Its fruit is round, and in size nearly equal to a pea. See *Hackberry* and *Nettle-tree*.

Hooper (hụp'ẽr), JOHN, an English reformer, born in 1495. Having studied at Oxford, he joined the Cistercian order, but by the year 1539 he had adopted the Reformed opinions, and withdrew to the continent on the imposition of new articles of faith by Henry VIII, and lived at Zurich. In 1547 he returned to England, and took an active share in the Edwardine Reformation. In 1550 he was nominated Bishop of Gloucester, but declined consecration until certain vestments and ceremonies were dispensed with in his case. On the accession of Queen Mary, in 1553, Hooper was deprived and imprisoned, and in 1555, was burned at Gloucester, near his own cathedral. His works consist chiefly of a *Godly Confession and Protestation of the Christian Faith*, *Lectures on the Creed*, *Sermons on the Book of Jonah*. *Annotations on the Thirteenth Chapter of the Romans*, and expositions of several psalms.

Hooping-cough, or WHOOPING-COUGH, a disease known by a rapid series of coughs ending in a long-drawn inspiration, during which a shrill whistling sound, the *hoop*, is produced. Two or three such fits of coughing follow one another, until some phlegm is expelled, and vomiting may occur. During a severe spasm the face becomes swollen and purplish, as if suffocation were threatened. It is evidently due to a poison acting as an irritant on the pneumogastric nerve. It is contagious, and most commonly attacks children, and generally only once in their lives. The hooping-cough usually comes on with a running nose, difficulty of breathing, and slight fever, which are succeeded by a hoarseness, cough and difficulty of expectoration.

Hoopoe (hụ'pö; *Upŭpa*), a bird forming the type of a family generally classed with the bee-eaters or the honey-eaters, but also with the horn-

Hoopoe (*Upŭpa epops*).

bills. The European hoopoe (*U. epops*) is about 12 inches long; it has a fine crest of pale cinnamon-red feathers, tipped with black; upper surface on the whole ashy-brown; wings black, the coverts having white bars; throat and breast pale fawn; abdomen white, with black streaks and dashes. It has a very wide range, from Burmah to the Britisl Islands and Africa. It is a ground-feeder, preying chiefly on insects, and seems to delight in filth; it nests in cavities of trees or walls, and its eggs vary from four to seven. The hoopoe utters a loud double or treble *hoop*, whence its name.

Hoorn (hōrn), a seaport of Holland, on a small bay of the Zuider-Zee, 20 miles N. N. E. of Amsterdam. The trade is extensive, more especially in cheese. Pop. 10,647.

Hoosac Tunnel, a railway tunnel in the western part of Massachusetts, on the railway

from Boston to Troy, N. Y. It pierces the Hoosac Mountain, the summit range extending southward through Massachusetts from the Green Mountains of Vermont. It is 4¾ miles long, and has a double line of rails.

Hoosick Falls, a village of Rensselaer County, New York, 25 miles N. E. of Troy. It has manufactures of reapers, mowers, woolen goods, iron and paper mill machinery. Pop. 5532.

Hop (*Humŭlus lupŭlus*), a plant of the nat. order Cannabinaceæ (hemp family), a native of Europe, and perhaps of the United States, where it occurs wild. The root is perennial, giving out several herbaceous, rough, twining stems, with large lobed leaves; the fertile flowers are green; the fruit is a catkin, and the plant is cultivated for the sake of the catkins, which are employed to communicate to beer its bitter flavor. The young shoots are sometimes boiled and eaten like asparagus; the fibers of the old stems make good cords. The cultivation of the hop is more carefully attended to in England than in any other country, Kent being the chief county in which it is grown, but the plant is also extensively reared in other parts of Europe, as also in North America, Australia, New Zealand, etc. The use of the hop catkins depends upon a peculiar bitter substance which they contain, called *lupulin*, which is a yellow powder, containing a bitter principle and a volatile oil. The lupulin constitutes from 10 to 12 per cent. by weight of the catkin, and the bitter principle forms 8 to 12 per cent. of the lupulin. Having tonic, stomachic and narcotic properties, hops are often used medicinally. Pillows stuffed with hops are used to induce sleep.

Hop (*Humŭlus lupŭlus*)

Hop-clover (*Trifolium procumbens*), a plant of the order Leguminosæ, distinguished from other species of clover by its bunch of yellow flowers.

Hope (hōp), Anthony. See *Hawkins.*

Hope, Thomas, an English writer and art patron, born in 1770; died in 1831. He inherited great wealth, and devoted much of his time while young to extensive travels in various parts of Europe, Asia and Africa. His principal works are: *Household Furniture and Internal Decorations; The Costume of the Ancients; Anastasius, or Memoirs of a Modern Greek,* a novel displaying remarkable descriptive powers and a minute accuracy in the accounts of eastern life; and *An Historical Essay on Architecture.*

Hop-flea (*Haltĭca concinna*), a coleopterous insect of the same genus with the turnip-fly, and which devastates hop plantations. The fleas eat up the young shoots, and even after the hop stems have grown eight or nine inches long they will devour every leaf and head.

Hop-fly (*Aphis humŭli*), a species of plant-louse very destructive to the hop. The winged female is green with a black head and bands and spots of black on the body; the legs and wings are long.

Hopkins, Johns, philanthropist, born in Anne Arundel County, Maryland, in 1795. In 1873 he gave property worth $4,500,000 to found a free hospital in Baltimore; he also presented Baltimore with a public park, and gave over $3,000,000 to found the Johns Hopkins University in Baltimore. He died in 1873.

Hopkins, Mark, educator, born in Stockbridge, Massachusetts, in 1802. He was president of Williams College in 1836-1872, and for 30 years president of the American Board of Commissioners for Foreign Missions. He died in 1887.

Hopkins, Stephen, statesman, born in Providence, Rhode Island, in 1707; died in 1785. He became chief justice of the Superior Court of Rhode Island in 1751, and was elected governor in 1756. He was a member of the Continental Congress and a signer of the Declaration of Independence.

Hopkinson (hop'kin-sun), Francis, a signer of the Declaration of Independence, was born in Philadelphia in 1737. He was admitted to the bar in 1761. In 1776 he was delegate to the Continental Congress. During the war for independence his patriotic writings powerfully influenced public sentiment. His humorous *Battle of the Kegs* still holds a place in literature. He died in 1791.

Hopkinsville, capital of Christian County, Kentucky, 74 miles S. of Henderson; has an extensive trade in tobacco, and various manu-

factures. Here are McLean College and Bethel Female College. Pop. 9419.

Hoquiam, a city in Chehalis County, Washington, 18 miles W. of Montesano. It is in a forest region and has many large lumber mills. Ships lumber, fish and furs. Pop. 8171.

Horæ (hō'rē), in classical mythology, the goddesses of the seasons and the order of nature. Their number was indefinite; in Athens two only were worshiped. They are represented as blooming maidens carrying the different products of the seasons.

Horæ Canonicæ, or simply HORÆ, in the Roman Catholic Church the canonical or appointed hours at which certain hymns and devotions, themselves termed *Horæ* or *Hours*, are performed in monasteries. See *Canonical Hours*.

Horapollo (ho-rå-pol'o), the alleged author of a work in Egyptian hieroglyphics pretended to have been translated from the Egyptian into Greek. By many authorities the book is supposed to have been written about the fifth century and translated as late as the fifteenth.

Horatii (ho-rā'she-ī), three Roman brothers, who, according to tradition, in the reign of Tullus Hostilius engaged three Alban brothers (the Curiatii), in order to decide the supremacy between Rome and Alba. Victory went to Rome, and the sole surviving Horatius was triumphantly conducted back to the city. But his sister had been betrothed to one of the Curiatii, and her demonstrative grief so enraged Horatius that he stabbed her. For this he was condemned to death, but his father and the people obtained his pardon.

Horatius Cocles (ho-ra'she-us ko'klēz), a hero of ancient Rome. The Tarquins having, after their banishment, sought refuge with the Etrurian king Porsenna, the latter advanced against Rome (B.C. 507) to restore them. According to tradition Horatius Cocles, along with two companions, held the Sublician bridge against the enemy, while the Romans broke it down behind them. When this was nearly finished he sent back his two companions, and as the bridge fell he plunged into the Tiber with his armor and safely reached the opposite bank.

Horatius Flaccus, QUINTUS, commonly known as HORACE, the greatest of Latin lyric poets, was born near Venusia, in Southern Italy, B.C. 65. His father was a freedman, a collector of taxes, and had purchased the farm at which his son was born. When Horace was about twelve years of age his father removed with him to Rome, where he received an excellent education. At the age of eighteen he went to Athens to complete his studies. After the assassination of Julius Cæsar Brutus came to Athens, and Horace, along with other Romans youths, joined the army. He was appointed to a military tribuneship, was present at Philippi, and on the defeat of Brutus saved himself by flight. On the proclamation of an amnesty to the vanquished Horace returned to Italy, but found his father dead, his paternal estate confiscated, and himself reduced to poverty. He was, however, enabled to purchase a clerkship in the quæstor's office, which enabled him to subsist frugally and to cultivate his poetical talent. His poems procured him the friendship of Virgil and Varius, and to them he was indebted for his first acquaintance with Mæcenas, who was the friend and confident of Augustus Cæsar, and who expended his wealth for the encouragement of literature and the arts. Mæcenas received Horace among his intimate friends, and, after some years, presented him with a small estate or farm in the Sabine country about 15 miles from Tibur (Tivoli), which was sufficient to maintain him in ease and comfort during the rest of his life. He had also a cottage at Tibur, and at Rome or one or other of these country residences the latter part of his life was spent. Although he was ultimately introduced to Augustus he never sought favors from him, and he is said to have declined an offer of the management of his private correspondence. He died in B.C. 8, the same year as his friend and patron Mæcenas. His works consist of four books of odes; a book of epodes or short poems, two books of satires; and two books of epistles, one of which is often cited as a separate work, under the title of *Ars Poctica*. The lyrics of Horace are largely based on Greek models, but the exquisite beauty of his language is all his own. It is, however, in his satires and epistles that he shows the greatest power and originality, wit and humor, gravity and gaiety, shrewdness and common sense, tender sentiment, and at times melancholy. His writings have been often translated, and into many languages. In English Pope and Swift have given free imitations of various parts of his writings. The poetical translation of Francis is well known, but is inferior to that of Sir Theodore Martin.

Hörde (*heur'dė*), a town of the Prussian province of Westphalia on the Emscher, center of the iron manufac-

ture, and having large coal-mines. Pop. (1905) 28,461.

Horde'olum See *Stye.*

Hor'deum See *Barley.*

Horeb (hō'reb; Arabic, *Jebel Mûsa*, Mountain of Moses), a mountain belonging to the same ridge as Mount Sinai, where is still pointed out the rock from which water issued at the blow of Moses.

Horehound (hōr-hound; *Marrubium vulgāre*), a labiate plant, with whitish, downy leaves and stem; flowers, small, nearly white, in crowded whorls, possessing an aromatic smell and bitter flavor. It is a popular remedy for coughs and colds, usually as an infusion. It is a native of Europe. Black horehound (*Ballōta nigra*), also a labiate plant, is a malodorous and unattractive weed. Horehound is domesticated in the United States.

Horehound (*M. vulgāre*).

Horgen (hōr'gen), a town of Switzerland, on the lake of Zürich, with some manufactures and a harbor with a considerable trade. Pop. 6914.

Horizon (ho-rī'zon), in ordinary speech the line where earth and sky seem to meet, or the circle which bounds that part of the earth's surface visible to a spectator from a given point. This is termed the *sensible*, *visible* or *apparent horizon*, as distinguished from the *rational* or *celestial horizon*, an imaginary great circle, parallel to the sensible horizon, whose plane passes through the earth's center, whose poles are the zenith and the nadir, and which divides the sphere into two equal hemispheres. In observations with the sextant at sea, when the real horizon is invisible a small basin containing mercury may serve as an *artificial horizon*. The observation that is then made is the angle between the sun or star and the image of the sun or star in the basin of mercury, and it is easily seen that half this angle is the altitude of the object above the real horizon. In geology, the term is applied to any well-marked formation which suffices as a starting-point from which to study the rest.

Horizon, Dip of. See *Dip.*

Horizontal Parallax. See *Parallax.*

Horn (hōrn), a general term applied to all hard and pointed appendages of the head, as in deer, cattle, etc., but as a term denoting a particular kind of substance nothing should be called horn which is not derived from the epidermis or outer layer of the integument, whether on the trunk, hoofs, or head. Horn is a tough, flexible, semitransparent substance, most liberally developed in the horns of bovine animals, but also found in connection with the 'shell' of the tortoise, the nails, claws and hoofs of animals, the beaks of bird and turtle, etc. Horn is softened very completely by heat, so as to become readily flexible, and to adhere to other pieces similarly softened. True horn consists principally of an albuminoid principle, *keratin*, with a small portion of gelatine and a little phosphate of lime. In some species of animals the males only have horns, as for instance the stag. In cattle both male and female have horns, though there are also hornless cattle. Horns differ widely in the case of different animals. Thus the horns of deer consist of bone, and are deciduous; those of the giraffe are independent bones, with a covering of hairy skin; those of oxen, sheep, and antelopes consist of a bony core covered by a horny sheath. The horns of the rhinoceros alone consist exclusively of horny matter. The horns of oxen, sheep, goats and antelopes are never shed, except in the case of the prong-horned antelope. The number never normally exceeds four, and in the case of deer the horns are branched.

The various kinds of horns are employed for many purposes. The principal used in the arts are those of the ox, buffalo, sheep and goat. Deer horns are almost exclusively employed for the handles of knives and of sticks and umbrellas. Those which furnish true horn can be softened by heat (usually in boiling water), cut into sheets of various thickness, which sheets may be soldered or welded together at the edges so as to form plates of large dimensions, and polished and dyed so as to imitate the much more expensive tortoise shell. The clippings of horn may be welded together in the same manner, and made into snuff-boxes, powder horns, handles for umbrellas, knives, forks, etc. As horn has the valuable property of taking on and retaining a sharp impression from a die, many highly ornamental articles may be turned out. Combs for the hair are made from the flattened sheets, and out of the solid parts of buffalo horns beautiful carvings are made.

Horn, a musical instrument, originally formed, as the name de-

notes, from the horn of an animal. The name includes a large family of wind-instruments, many of which have fallen into disuse. The French horn, or simply *the horn*, consists of a metallic tube of about 10 feet in length, very narrow at top, bent into rings, and gradually widening towards the end whence the sound issues, called the *bell*. It is blown through a cup-shaped mouthpiece of brass or silver, and the sounds are regulated by the player's lips, the pressure of his breath, and by the insertion of the hand in the bell of the instrument. As a simple tube, unprovided with holes, the horn yields only the generating note, and of course would be confined to one key; but by means of *crooks* the tube can be lengthened, and transposed into any key. By inserting the hand into the bell, which flattens a note, the intermediate notes are produced. The compass of the instrument is three octaves. Music for the horn is always written in the key of C, an octave higher than it is played, with the key of the composition marked at the beginning of each movement: thus 'corni (or horns) in D' directs the performer which crook he must use to play the notes in the key indicated. The bugle, cornet-a-piston and saxhorn are allied instruments.

Horn, CAPE. See *Cape Horn.*

Horn, HOORNE, or HORNES, PHILIP, COUNT VAN, a Flemish soldier and statesman, born 1518. He was the son of Joseph de Montmorency-Nivelle, and of Anne of Egmont, and stepson of John, count van Horn, who constituted him and his brother his heirs on the condition of assuming his name. Philip gradually rose to be governor of Gueldres and Zütphen, admiral of the fleet, and councilor of state. He fought at St. Quentin in 1557, and at Gravelines in 1558, and in 1559 accompanied Philip to Spain. On his return he joined the Prince of Orange and Egmont in resistance to Philip. On the arrival of Alva at Brussels he was arrested in September, 1567, on a charge of high treason, and he and Egmont were beheaded in June, 1568.

Hornbeam (hōrn'bēm; *Carpīnus Betŭlus*, nat. order Cupuliferæ), a small bushy tree common in Britain, and often used in hedges, as it stands cutting and in age becomes very stiff. The wood is white, tough, and hard, and is used in turnery, for cogs of wheels, etc. The inner bark yields a yellow dye. The American hornbeam (*Carpīnus americāna*) is a small tree sparingly diffused over the whole of the United States. The wood is fine grained, tenacious, and very compact.

Hornbills (hōrn'bilz), a remarkable group of birds (*Bucerotidæ*), confined to Southern Asia and Africa, akin to the kingfishers and the toucans, remarkable for the very large size of the bill, and for an extraordinary horny protuberance by which it is surmounted, nearly as large as the bill itself, and of cellular structure within. The rhinoceros hornbill (*Bucĕros rhinoceros*) is almost the size of a turkey, of a black color, except on the lower part of the belly and tip of the tail, which are white. It

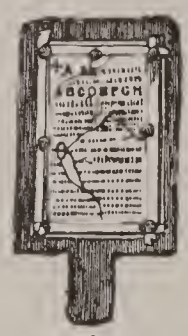
Rhinoceros Hornbill (*Bucĕros rhinoceros*).

has a sharp-pointed, slightly-curved bill, about 10 inches long, and furnished at the base of the upper mandible with an immense appendage in the form of an inverted horn. The skeleton though bulky is very light, being permeated with air to an unusual degree. During incubation the female is plastered up in the hollow of a tree and fed by the male through a small aperture left for the purpose. The hornbills are of arboreal habit, and feed on fruits; but in captivity they take small reptiles, and the Abyssinian species even attacks snakes.

Hornblende (hōrn'blend), or AMPHIBOLE, one of the most abundant and widely diffused of minerals, remarkable on account of the various forms and compositions of its crystals and crystalline particles, and of its exceedingly diversified colors, thus giving rise to almost numberless varieties, many of which have obtained distinct appellations. It is sometimes in regular distinct crystals, more generally the result of confused crystallization, appearing in masses composed of laminæ, acicular crystals, or fibres, variously aggregated. It enters largely into the composition and forms a constituent part of several of the trap-rocks, and is an important constituent of several species of metamorphic rocks, as gneiss and granite. In color hornblende exhibits various shades of green, often inclining to brown, white

and black with every intermediate shade; it is nearly transparent in some varieties, in others opaque; hardness about the same with felspar; specific gravity, 3.00. Its chief constituents are silica, magnesia and alumina. The principal varieties are hornblende proper, divided into three subvarieties, basaltic hornblende, common hornblende and hornblende slate; tremolite, actinolite, nephrite, pargasite and asbestos.

Hornbook (hōrn'bu̇k), in former times the first book of children, or that in which they learned their letters; so called from the transparent horn covering placed over the single page of which it usually consisted, the whole being fixed to a wooden frame with a handle. It generally contained the alphabet in Roman and small letters, several rows of monosyllables, and the Lord's Prayer. The alphabet was usually prefaced with a cross, or was printed in the form of a cross; hence the term Christ-cross row, corrupted into *criss-cross* row, applied to the alphabet, and by extension to the hornbook.



Hornbook.

Horncastle (hōrn'kas-tl), a town of England, County of Lincoln, 21 miles east of the city of Lincoln. There is a considerable trade in corn and wool, and one of the largest horse-fairs in the United Kingdom is held annually in August. Pop. 3900.

Horne (hōrn), Richard Hengist, poet, dramatist, and miscellaneous writer; born at London about 1803; died in 1884. He was educated for the army at Sandhurst, entered the Mexican navy, and served during the war between Mexico and Spain. In 1828 he began his literary career, and produced several tragi-comedies of an ironical and satirical kind, and a large quantity of miscellaneous work. In 1843 he made his historic appeal to public judgment by publishing his epic *Orion* at one farthing. In 1844 *A New Spirit of the Age*, a critical work in which he was assisted by Miss Barrett (Mrs. Browning) and Robert Bell, appeared. In 1852 he took to gold-digging in Australia, still keeping in touch with his literary work. Of his many writings, the best known are *Orion*, *Cosmo de Medici*, *The Death of Marlowe* and *Prometheus*.

Horned Horse, the gnu (which see).

Horned Owl, a familiar name applied to several species of owls having two tufts of feathers on the head, supposed to resemble horns. See *Owls*.

Horned Pout. See *Catfish*.

Horned Screamer (*Palamedea cornūta*), a South American grallatorial bird having a long, slender, movable horn projecting from its forehead. Its voice is loud and shrill, and is uttered suddenly and with such vehemence as to have a very startling effect.

Horned Toad, a name given to a genus of lizards (*Phrynosōma*), of toad-like appearance, found in the United States west of the Mississippi. There are nine different species.

Hornell, a city of Steuben County, New York, 60 miles s. of Rochester. It is the trade center of a large farming region, and has large railroad repair shops, iron foundry, and manufactures of silk, gloves, shoes, leather, etc. Pop. 13,617.

Horner (hōr'nėr), Francis, politician and economist, born at Edinburgh in 1778; died at Pisa in 1817. He studied for the Scottish bar, but, exchanging it for the English bar, took up his residence in London in 1803. He had early, with his friends Jeffrey and Brougham, declared his preference for Whig principles, and in 1806, when Mr. Fox came into office, obtained through ministerial influence a seat in Parliament. He became an authority on financial and economic matters; was chairman of the Bullion Committee of 1810, and was mainly the means of checking the evils of an inconvertible paper currency. He was one of the originators of the *Edinburgh Review*, for which he wrote many articles.

Hornet (hōr'net), an insect of the genus *Vespa* (*V. crabro*), much larger and stronger than the ordinary wasp. It is very voracious, feeding on fruit, honey, etc., and preying on other insects. Hornets form their nest of a kind of paper-work in hollow trees and walls, and are able with their sting to inflict a painful wound, usually accompanied with considerable swelling.

Horn of Plenty. See *Cornucopiæ*.

Horn Silver, native chloride of silver, so called because when fused it assumes a horny appearance.

Hornstone. See *Quartz*, *Chert*.

Hornwork, in fortification, a work with one front only

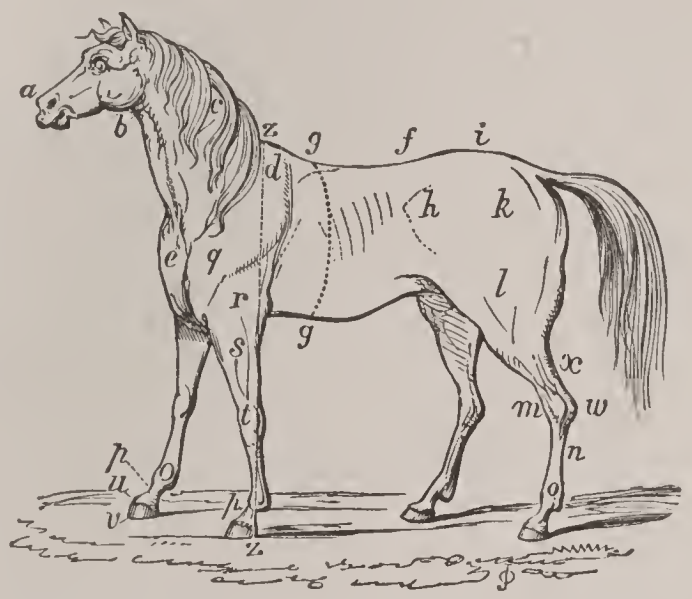
thrown out beyond the glacis for the purpose of either occupying rising ground, barring a defile, covering a bridge-head, or protecting buildings.

Horology (hor-ol′ō-ji). See *Clock* and *Watch*.

Horoscope (hor′u-skōp), in astrology, a scheme or figure of the twelve houses, or twelve signs of the zodiac, in which is marked the disposition of the heavens at a given time and place, and by which astrologers formerly told the fortunes of persons, according to the position of the stars at the time of their birth. To each of the houses was assigned a particular virtue or influence. The ascendant was that part of the heavens which was rising in the east at the moment; this was the first and most important house, or house of life, and contained the five degrees above the horizon and the twenty-five beneath it. Other houses were those of riches, marriage, death, etc.

Horsa. See *Hengist*.

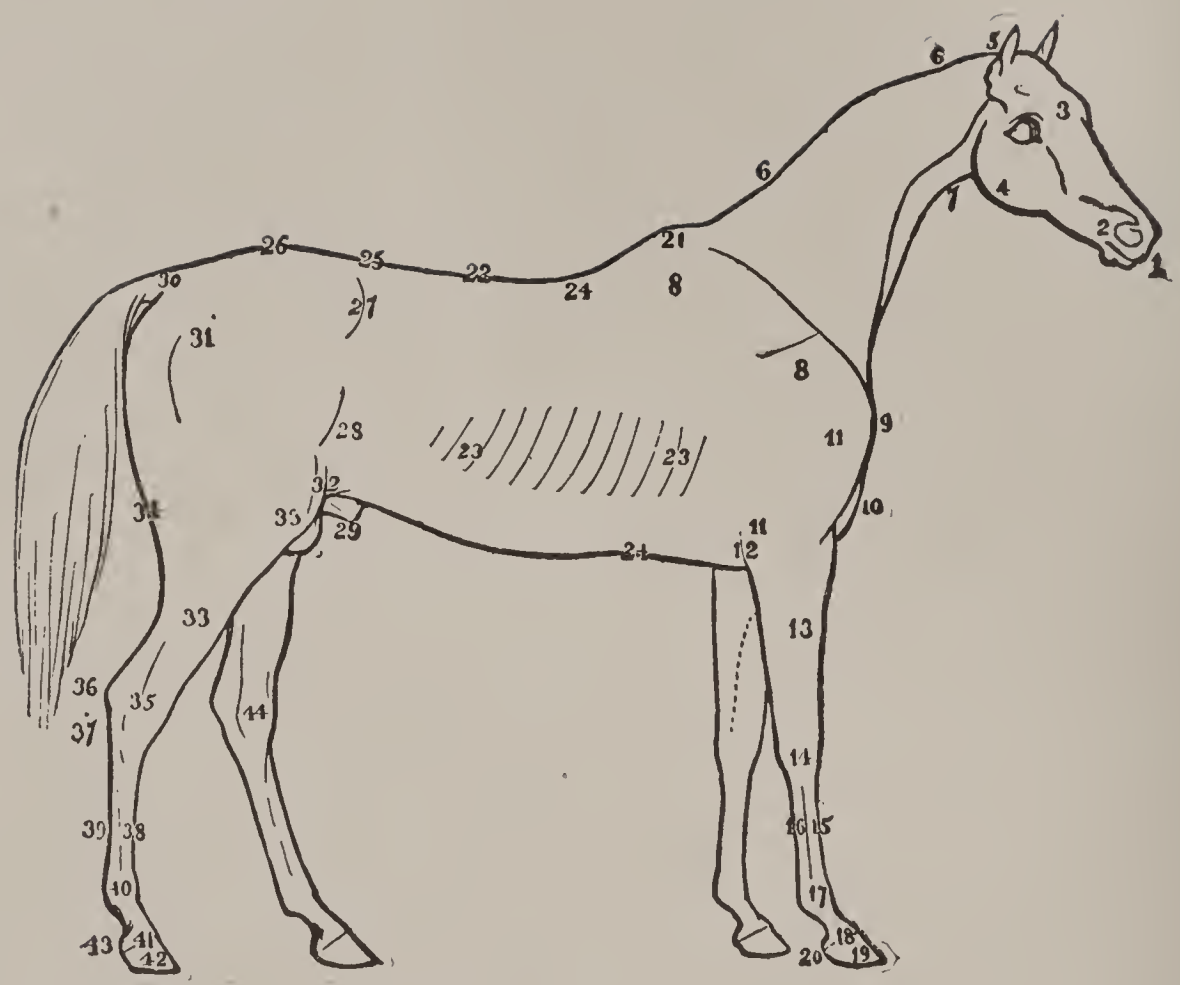
Horse (*Equus caballus*), a well-known quadruped belonging to the family Equidæ, order Ungulata (hoofed animals), and subdivision Perissodactyla (odd-toed); characterized by an undivided hoof formed by the third toe and its enlarged horny nail, a simple stomach, a mane on the neck, and by six incisor teeth in each jaw, seven molars on either side of both jaws, and by two small canine teeth in the upper jaw of the male, rarely in the female. The family includes also the asses and zebras, and original types appear to have been at one time common in both the Old World and the American continent. No horses existed in America when it was discovered by Columbus, those now found in a wild state there being descendants of those introduced by the Spaniards. But a number of fossil species have been described from America—one of them standing only two and a half feet in height. The descent of the present horse can be traced through several fossil forms back to an animal only about the size of a fox, and having four separate digits or toes on the feet. Subsequent forms show how the third toe developed at the expense of the others till eventually a form identical with the common horse appeared. It is doubtful whether the horse is now anywhere to be found in its native state, the wild horses of the steppes of Tartary and other regions of the Old World being possibly descendants of animals escaped from domestication. The horse was probably first domesticated in Asia, and it varies much in form, size, and character with the climate and nature of the district it inhabits. Arabia produces perhaps the most beautiful breed, which is also swift, courageous, endurant and persevering. As bred in modern times the horse has attained high perfection. Two breeds—namely, the large, powerful, black breed of Flanders, and the Arabian—have contributed more than all others to develop the present varie-



Horse—Terms Applied to Different Parts.

a, Muzzle. *b*, Gullet. *c*, Crest. *d*, Withers. *e*, Chest. *f*, Loins. *g g*, Girth. *h*, Hip or ilium. *i*, Croup. *k*, Haunch or quarters. *l*, Thigh. *m*, Hock. *n*, Shank or cannon. *o*, Fetlock. *p*, Pastern. *q*, Shoulder-bone or scapula. *r*, Elbow. *s*, Fore thigh or arm. *t*, Knee. *u*, Coronet. *v*, Hoof. *w*, Point of hock. *x*, Hamstring. *z z*, Height.

ties from the original, comparatively light-limbed, wiry race. The former laid the foundation of size, strength and vigor for draught horses and for those anciently used in war, while the latter conferred speed and endurance. The ladies' palfrey is largely derived from the Spanish genet, a small, beautiful, fleet variety of the Moorish barb. The hunter, characterized by speed, strength and endurance, represents the old English, Flanders and Arabian breeds. The race horse has less of Flemish and more of Arabian blood. Horses are said to have 'blood' or 'breeding' in proportion as they have a greater or less strain of Arab blood. At the age of two years the horse is in a condition to propagate. The mare carries her young eleven months and some days, continues to breed till the age of sixteen or eighteen years, and lives on an average between twenty and thirty years. The various species of the horse family have been artificially crossed by man, and are found to be fertile with each other; the offspring, however, are generally sterile.



POINTS OF THE HORSE.

HEAD.

1. Muzzle.
2. Nostril.
3. Forehead.
4. Jaw.
5. Poll.

NECK.

6. 6. Crest.
7. Thropple or windpipe

FORE-QUARTER.

8. 8. Shoulder-blade.
9. Point of shoulder.
10. Bosom or breast.
11. 11. True-arm.
12. Elbow.
13. Forearm (arm).
14. Knee.
15. Cannon-bone.
16. Back sinew.
17. Fetlock or pastern-joint.
18. Coronet.
19. Hoof or foot.
20. Heel.

BODY OR MIDDLEPIECE.

21. Withers.
22. Back.
23. 23. Ribs (forming together the barrel or chest).
24. 24. The circumference of the chest at this point, called the girth
25. The loins.
26. The croup.
27. The hip.
28. The flank.
29. The sheath.
30. The root of the dock or tail.

THE HIND-QUARTER.

31. The hip-joint, round, or whirl-bone.
32. The stifle-joint.
33. 33. Lower thigh or gaskin
34. The quarters.
35. The hock.
36. The point of the hock.
37. The curb place.
38. The cannon-bone.
39. The back sinew.
40. Pastern or fetlock-joint.
41. Coronet.
42. Foot or hoof.
43. Heel.
44. Spavin-place.

The horse is, strictly speaking, an herbivorous animal, and is more scrupulous in the choice of his food than most other domestic quadrupeds. The staple diet on which horses are kept is oats and hay, with beans added for horses subjected to heavy work. As a substitute for, or an addition to the regular food, bran, linseed and carrots are used. The age of a horse can be told by the marks on its teeth, which change a little yearly until the animal is about nine years old, after which period it is difficult to determine the age by mark. In some countries the flesh of the horse is used as food; the hide is made into leather; and the hair of the mane and tail is used for making haircloth, for upholsterers' stuffing, etc.

Horse-chestnut, a handsome genus of trees or shrubs (*Æscŭlus*) belonging to the nat. order Sapindaceæ, having large opposite digitate leaves, and terminal panicles of showy white, yellow, or red flowers. *Æ. Hippocastănum* (the common horse-chestnut) is familiar to every one. The seeds are large and farinaceous, and have been used as food for animals; they are bitter, and the bark is also bitter, astringent and febrifugal. The tree is said to have been brought from Constantinople to England in the beginning of the sixteenth century, and is supposed to be a native of Northern Asia. Three other species are found in North America, where they are popularly known under the name of *Buckeye*.

Horse-fly, the *Hippobosca equina*, a winged genus of the family Hippoboscidæ, parasitical on the horse.

Horse-guards, the name given to the public office, Whitehall, London, appropriated to the departments under the commander-in-chief of the British army; applied also to the military authorities at the head of the war department, in contradistinction to the civil chief, the secretary-at-war. The name was given to the building from a guard having been kept there by the horse-guards. See *Guards*.

Horse-latitudes, a space in the Atlantic Ocean between the westerly winds of higher latitudes and the trade-winds, notorious for baffling winds and tedious calms.

Horse Mackerel. See *Blue-fish* and *Scad*.

Horsens, a seaport in Denmark, east coast of Jutland, on a fiord of the same name, 25 miles S. W. of Aarhuus. It has manufactures of tobacco and a good general trade. It is the birthplace of Vitus Behring, the discoverer of Behring Strait. Pop. 22,243.

Horse-power, the power of a horse or its equivalent; the force with which a horse acts when drawing. The mode of ascertaining a horse's power is to find what weight he can raise and to what height in a given time, the horse being supposed to pull horizontally. From a variety of experiments of this sort it is found that a horse, at an average, can raise 160 lbs. weight at the velocity of 2½ miles per hour. The power of a horse exerted in this way is made the standard for estimating the power of a steam engine. Thus we speak of an engine of 60 or 80 horse-power, each horse-power being estimated as equivalent to 33,000 lbs. raised one foot high per minute. Engineers differ widely in their estimate of the work a horse is able to execute. That given above is the estimate of Boulton and Watt based on the work of London dray-horses, but it is considered much too high, 17,400 foot-pounds per minute being generally considered nearer the truth. As it matters little, however, what standard be assumed, provided it be uniformly used, that of Watt has been generally adopted. The general rule for estimating the power of a steam engine in terms of this unit is to multiply together the pressure in pounds on a square inch of the piston, the area of the piston in inches, the length of the stroke in feet, and the number of strokes per minute, the result divided by 33,000 will give the horse-power, deducting one-tenth for friction. As a horse can exert its full force only for about six hours a day, one horse-power of machinery is equal to that of 4.4 horses. *Nominal* or *calculated horse-power* is a term still used, but of little real value, from its being calculated on steam at a pressure much below the real power exerted. Sometimes the *real*, *actual*, or *indicated horse-power* exceeds the *nominal* by as much as three to one.

Horse-racing, a sport of ancient origin, having been practised among the Greeks and Romans. The institution of horse races in England belongs to a very remote period. The first regular horse races, however, did not take place till the reign of James I. The prize then consisted of a gold or silver bell, whence we have the expression 'to wear away the bell.' The successors of James I down to Queen Anne were all more or less attached to the sport. Under George I horse-racing became more and more flourishing, and the sport continued to grow in importance during the remainder of the century. The two most celebrated horses of that period were Flying Childers (foaled in 1715)

and Eclipse (foaled in 1764), which long had the reputation of being the fleetest horses that ever ran. The former ran four miles in 6 min. 48 sec., carrying 9 st. 2 lbs. The latter was never beaten. None of the English sovereigns was more devoted to horse-racing than George IV. Between 1784 and 1792, while yet Prince of Wales, he gained 185 prizes, including the Derby of 1788. Horse-racing was introduced into France from England, and during the reign of Louis XIV, and still more during that of Louis XV, was pursued with the utmost enthusiasm. The revolution put an end to it for a time, but the sport was revived by Napoleon. Horse-races, mostly upon the English model, have also been introduced into various other countries. The principal varieties of horse-racing are flat-racing, or racing on level ground; steeple-chasing, or racing over ground not specially prepared for the purpose; hurdle-racing, in which the horses have to leap over obstacles purposely placed in the way; and match trotting. This last kind of race is a very favorite one in the United States, where the best trotting horses are to be found, but in England it is not much practised. Formerly all races were what is called weight-for-age races, that is, a specified difference in weight was conceded by the older horses. But it was found that when races were conducted on this plan the best horses came to be known, and the inferior ones withdrew, not venturing to compete with them, so that the race resulted in a walk-over. Hence arose the practice of handicapping, that is, of adjusting as nearly as possible the weight to be carried to the previously ascertained powers of the horse, so as to reduce the chances of all the horses entered to an exact equality. Since the introduction of this practice, handicap races have become a very favorite sport.

In the American colonies racing was introduced early in the eighteenth century, and was practiced to some extent in Maryland and Virginia by the middle of the century. Bully Rock, the first American thoroughbred, was imported in 1730, and Bonny Lass, a brood mare of fine pedigree, about 1740. After this time racing stock was frequently imported and the racing area extended from New York to the Carolinas. After the Revolutionary war many fine racers were brought over and the stock of blooded horses rapidly increased. But it was the development of the trotting horse to which the chief attention was paid in the United States, and in its trotters this country has grown preëminent. The American trotter began its career in the importation to Philadelphia of the English thoroughbred Messenger in 1788. He was 8 years old when brought over and was used in breeding for 20 years. The trotting instinct appeared in nearly all his descendants and it is to the Messenger stock that much the greater part of the notable trotters in this country is due. The first record of a public trotting match was in 1818, when the gray gelding Boston Blue made a mile in 3 minutes. Such a feat was at that time thought impossible and when 2.40 was reached in 1824, this became a popular phrase signifying marvelous speed. Edwin Forrest trotted a mile in 2.31½ in 1834, while Lady Suffolk made a record of 2.26½ in 1843. Year after year after this the time was cut down, though by small amounts. Dexter in 1867 made a mile in 2.17¼; in 1885 Maud S. cut this down to 2.08¾, and finally in 1897, Star Pointer crossed the 2 minute goal, making a mile in 1.59¼, and Lou Dillon, in 1903, in 1.58½. Pacing records have reached the still lower level of 1.55, made by Dan Patch in 1906. Running is a faster pace than trotting, and the American running record has reached the low limit of 1.35½. This was made by Salvator, at Monmouth Park, in 1890.

Horseradish (*Cochlearia armoracia*), a common garden herb, acrid and stimulating in character. It is used in pharmacy in the preparation of compound spirit of horseradish. Horseradish is used in a fresh state as a condiment with meats.

Horse-tail, among the Turks and other Eastern nations, the tail of a horse mounted on a lance, and used as a standard of rank and honor. The three grades of pashas are distinguished by the number of tails borne on their standards, three being allotted to the highest dignitaries or viziers, two to the governors of the more important provinces, and one only to those of the less important districts of the country.

Horse-tail Standard of Pasha.

Horsham (hōrs'am), a town of England, in the county of Sussex, on a branch of the river Arun, 37 miles S. S. W. of London, and 22 miles N. W. of Brighton. It formerly sent a member to parliament, and now gives name to a parliamentary division of the county. **Pop. (1911) 11,314.**

Horsley (hōrs'li), SAMUEL, English bishop, born in 1733; died in 1806. He was educated at Cambridge, and in 1759 became rector of Newington Butts. In 1767 he was chosen a fellow of the Royal Society, of which he was appointed secretary in 1773. After several charges he was appointed in 1788 Bishop of St. David's, from which he was translated to Rochester in 1793, receiving at the same time the deanery of Westminster; and finally to St. Asaph in 1802, when he resigned his deanery. Dr. Horsley was the greatest theological controversialist of his day, and is famous for his controversy with Priestley on Unitarianism. He published numerous sermons, and several works on Biblical criticism, besides editing an edition of Sir Isaac Newton's works.

Horta (hor'ta), a town in the Island of Fayal, one of the Azores, on the shores of a small bay between two rocky headlands. It has a tolerable harbor, and exports wine, oranges and grain. Pop. 6734.

Hortense (or-tons). EUGENIE DE BEAUHARNAIS. See under *Beauharnais.*

Hortensius (hor-ten'she-us), QUINTUS, a Roman orator, born of an equestrian family B.C. 114; died B.C. 50. He held many military and civil offices, and was elected consul for the year 69 B.C. In the previous year he had been engaged to defend Verres during the famous prosecution in which Cicero acted for the accusers. Hortensius continued to maintain a generous and friendly rivalry with Cicero, acknowledging his superior oratorical powers without jealousy. His speeches are all lost.

Horticulture (hor'ti-kul-tūr; from L. *hortus*, garden, and *colere*, to till), or GARDENING, includes, in its most extensive signification, the cultivation of esculent vegetables, fruits, and ornamental plants. In large gardens there are generally separate departments for flowers, fruits and vegetables; but in small gardens they are usually more or less combined. A garden should be either on a level, but admitting of effectual drainage, or on a gentle slope, preferably on the lower portion of a slope facing the sun. It should be well sheltered, either naturally from situation or artificially by means of plantations, walls, etc. The character of the soil is of much importance. A good loam, or a sandy loam mixed with humus, is the best. The former is better fitted for fruit-trees, but for early crops the sandy loam is desirable. While the greater part of a garden should consist of such soil, either naturally or artificially formed, it is useful to have a portion stronger and another much lighter in order to suit the requirements of different plants. The nature of the subsoil is also important. The best is a dry bed of clay overlying sandstone. Digging, ploughing and pulverizing the soil, and exposing the surface to the action of the summer sun and the winter's frost are highly useful operations, by which the tenacity of stiff soils is overcome, weeds and insects are destroyed, and a quantity of air is admitted into the ground. Nutritive matter is frequently supplied to plants in the form of manure, either organic or inorganic. After the soil is properly dry and pulverized, the seeds are deposited, and this should always be done in dry weather, for a dry soil is especially requisite for covering in the seeds. Watering is often necessary as a means of nourishment to growing plants, especially as a support to newly transplanted vegetables, and for cleaning the leaves and destroying insects. The methods of propagating plants are various. For an account of the processes of budding and grafting see these articles. Another mode of propagation is that by means of cuttings, or shoots cut off and planted in the soil, where they take root. This process is exceedingly simple and easy in the case of many trees, as the willows and poplars; but requires some management in the heaths, myrtles, and other shrubs. In growing ornamental plants and flowers and exotic fruits, plant-houses of various kinds are necessary. These comprise the numerous forms of conservatory, plant-stove, greenhouse, pits and frames. Horticultural tools, instruments, implements and machinery are very various.

Hortus Siccus. See *Herbarium.*

Horus (hōr'us), the Latinized form of *Har.* the day, or the sun's path, an Egyptian divinity. Two gods were latterly recognized under the name. The elder Horus was the son of Seb (identified by the Greeks with Kronos) and Nu (Rhea) and brother of Osiris. The other Horus was the son of Osiris and Isis, and is supposed to have come into the world soon after the birth of his parents. On the death of Osiris he was his avenger, defeating the serpent

Typho, and enabling Isis to thwart his wicked designs. Both the elder and younger Horus were regarded as symbols of the sun.

Horus Apollo. See *Horapollo.*

Hosanna (hō-zan′a), a word composed of two Hebrew words occurring in Psalm cxviii, 25, signifying 'save now.' The psalm was sung on joyful occasions, and particularly at the feast of Tabernacles. The phrase is used as an exclamation of praise to God, or an invocation of blessings.

Hosea (hō-sē′a), the first in order among the minor prophets of the Old Testament, but probably the third in order of time, flourishing about 750 B. C. Nothing is known of his life, except that he was the son of Beeri, and that his ministry belonged to the reigns of Uzziah, Jotham, Ahaz and Hezekiah, kings of Judah. The nation generally and the ten tribes in particular are reproved, exhorted, and threatened in his prophecy. He predicts the approaching exile of his countrymen, and the consoling promise of the final return of an improved people.

Hoshangábád (hō-shang′ä-bäd), chief town and headquarters of district of the same name, Central Provinces of India, on the Nerbudda. It is a chief seat of the British piece-goods trade, and does business in cotton, grain, etc. Pop. about 15,000. The district has an area of 4437 sq. miles.

Hoshiarpur (hō′shē-ar-pör), chief town and seat of administration of district of same name, Punjab, India. Pop. about 20,000. The district has an area of 2180 sq. miles.

Hosiery (hō′zher-i), a general term all kinds of knitted articles, including drawers, petticoats, nightdresses, etc., and fancy articles such as head-dresses, hoods, shawls, neckerchiefs, watch-guards, cravats, etc. The materials used for the purpose are cotton, linen and wool, the last of which is sometimes mixed with cotton or silk. Silk is also frequently used alone. Nearly all articles of hosiery, except some fancy articles, are now made by a knitting-frame of some kind or other.

Hosmer (hos′mer), HARRIET, sculptor, born at Watertown, Massachusetts, in 1831. She studied at Rome, and among her best-known works are ideal heads of *Daphne and Medusa*, *Puck*, the *Sleeping Faun*, *Waking Faun*, *Beatrice Cenci*, etc. She died in 1908.

Hospice (hos′pis), signifies either a little convent belonging to a religious order, occupied by a few monks, and destined to receive and entertain traveling monks; or houses of refuge and entertainment for travelers on some difficult road or pass, as the Hospice of the Great St. Bernard.

Hospital (hos′pi-tal), any building appropriated for the reception of any class of persons who are unable to supply their own wants, and are more or less dependent upon public help to have those wants supplied. Hence hospitals are of various kinds, according to the nature of the wants they supply and the class of persons for whom they are intended. A large number of hospitals are medical; others are for the reception of incurables; others for the aged and infirm; others for the education of children of people in reduced circumstances; others for the reception of the wounded in battle; and so on. The first establishments of this nature are believed to belong to the fourth century after Christ. Their primary object was to afford a shelter to strangers and travelers, and it was only occasionally that the sick and infirm were admitted. One of the earliest hospitals of which we have any satisfactory information was that established by the emperor Valens at Cæsarea about the end of the fourth century, and which was conducted on a very large scale. The Arabs in Spain, at an early period of their occupation of that country, founded a magnificent hospital at Cordova, where physicians were trained, who did a vast deal to advance the study of medicine. The Arabs have also the credit of having founded the first lunatic asylum in Europe, which was erected in the city of diseases), fever and smallpox hospitals. everywhere are medical, often called infirmaries. These may be divided into general and special hospitals, the former class admitting cases of all kinds; the latter class admitting only patients suffering from some special trouble. Thus there are lying-in hospitals, cancer, consumption, ophthalmic, lock (for venereal diseases), fever and smallpox hospitals. There are also hospitals for children, and for persons suffering from incurable diseases. Such institutions serve a double purpose, inasmuch as they not only afford the best medical advice and treatment to the poor, who would otherwise be unable to obtain it, but also supply the best means of giving instruction in medicine and surgery, as in them students have the opportunity of witnessing cases of nearly every variety of disease, and observing how they are treated by the most skilled physicians and surgeons. For this reason a good infirmary or medical hospital is an indispensable adjunct

UNITED STATES HOSPITAL SHIP "SOLACE"

OPERATING ROOM, BATTLESHIP "INDIANA"

The "Solace" is attached to the navy, and is under the command of medical officers of the naval service. The ship is equipped with every modern device for rendering aid, and carries large quantities of medical stores. The lower view shows a modern operating room, such as is maintained on all battleships.

to every school of medicine and surgery. Hospitals for the sick and hurt are usually divided into wards, each containing a larger or smaller number of beds. Medical and surgical wards are usually kept separate, and all contagious diseases are treated by themselves in distinct buildings. Each hospital has a matron, house surgeon, and apothecary resident within its walls. The duties of the matron consist in regulating the night and day nurses, and the washing and laundry department, as well as the purchase of the necessary supplies of provisions, and keeping a general superintendence over the kitchen and messes of the sick. The house surgeon takes care of all casualties and accidents in the absence of the principal surgeons. The apothecary takes care of the pharmacy and prepares all the medicines prescribed from time to time by the surgeons and physicians. There is a well-lighted room set apart for the performance of operations, and a mortuary for the reception of corpses previous to interment. The nurses relieve each other day and night in a regular manner. Particular wards are set aside for the reception of persons laboring under various and peculiar denominations of disease. It has been objected to the present plan of constructing large edifices for hospital purposes, that the benefit they confer is greatly diminished by the risk of being attacked by hospital diseases, fever, erysipelas, pyæmia, etc., to which the patients are exposed; and the cottage or hut system of construction has been strongly advocated. This form of hospital consists of temporary detached huts or cottages which could be easily removed or replaced. Difficulties in connection with expense and administration have made this system impracticable. The pavilion system of construction is a compromise between the large blocks and the cottages or huts. According to this system the wards should be separated from the administrative part of the establishment, and should be arranged in pavilions of one story where practicable, but never more than of two. The pavilion should always surround the administrative blocks. This mode of construction is equally applicable to large and small establishments. The Royal Infirmary of Edinburgh, the Herbert Hospital of Woolwich, and the New York Hospital are among the best examples of the pavilion style. Convalescent homes, where patients are reinvigorated by a short stay after being cured in the infirmary, may be regarded as supplementary to medical hospitals, and among subsidiary institutions are dispensaries (which see) and schools for the training of nurses. The subject of the proper training of nurses has received great attention. Training schools have been organized in connection with nearly all the larger American hospitals, especially in New York and Philadelphia; and good results have followed in the largely diminished mortality of the hospitals where these trained nurses have been employed. Hospitals or asylums for inebriates have also been organized; likewise hospitals for opium habitues, and those addicted to the use of other forms of narcotics, in many parts of the United States.

Military and Naval Hospitals, or establishments for the reception and care of sick and wounded soldiers and seamen, have been in existence in all civilized countries for a long period. Military hospitals are either permanent or temporary establishments. Temporary hospitals are any available buildings in the immediate vicinity of the scene of operations. *Hospital ships* are ships fitted out as hospitals in all expeditions beyond the sea. They serve either as stationary hospitals or, if the sick accumulate, can sail home, or to the nearest station. Among the few institutions yet established for the special care of sick children may be mentioned the Sheltering Arms, Philadelphia. By intelligent treatment the mortality has rapidly decreased. Another numerous class of hospitals are those for the reception of aged men and women. Many of these are reserved for decayed members of particular professions. Among the other kinds of non-medical hospitals the only ones which it is necessary to mention here are foundling hospitals and orphan hospitals. On the subject of hospitals for the insane, see *Lunatic Asylums*.

Hospital Fever, is a malignant form of typhus fever, so called from its being most frequently met with in military and other large hospitals. See *Typhus Fever*.

Hospitallers (hos-pi-tal'ẽrs), charitable brotherhoods who devote themselves to tend the sick in hospitals. The name is specially applied to an order of knights, the Knights of St. John. See *John, Knights of St.*

Hospodar (hos'po-dȧr), a title of dignity formerly borne by the vassal princes of Moldavia and Wallachia, and in earlier times by the princes of Lithuania and the kings of Poland.

Host (hōst; Latin *hostia*, a sacrificial victim), a term used for the bread (or wafer) and wine in the eucharist, as containing the body and blood of Christ. As the wafer alone is

given to laymen in the Roman Catholic Church, as containing both the body and blood of the Redeemer, the term *host* is usually applied to the consecrated wafer. See *Elevation, Mass.*

Hostage (hŏst'aj), a person left as pledge or surety for the performance of the articles or conditions of a treaty. The taking or giving of hostages is now scarcely known in the relations of modern communities, but was formerly almost universal, and many questions in the law of nations arose out of the practice. If the stipulated terms were observed the hostages were returned on each side, but if the terms were violated or evaded the hostages might be put to death.

Hostilius. See *Tullus Hostilius.*

Hot Air Engine an engine in which the expansion of heated air is used as the motive power. Several devices of this kind have been invented, of which the most successful has been that of Ericsson. This has been considerably improved, and is now in use to some extent where small power is needed. There are several others in use, that of Belom being the only one used to furnish large power for an important industry, a large paper manufactory at Cusset, France. The chief advantage of the hot air engine is that it requires no boiler, and thus escapes the weight and danger incident to this necessity of a steam engine. On the other hand, the pressure to be obtained from hot air is much less than that of steam, and the working parts need to be much larger. But air engines are cheaper to make, more easily managed, and need less care than steam engines.

Hotbed, in gardening, a bed of earth heated by fermenting substances, such as fresh stable dung, tanners' bark, leaves of trees, etc., and covered with glass to defend it from the cold air; intended for raising early plants, or for nourishing exotic plants of warm climates, which will not thrive in cool or temperate air.

Hot Blast, a stream of air heated to 500° or 600° F., and forced through a furnace. It saves heat and accomplishes the reduction of refractory ores in less time and with less fuel than the cold blast.

Hotchkiss, Benjamin Berkely, inventor, born at Watertown, Connecticut, in 1826. The most notable of his inventions were the Hotchkiss magazine rifle and Hotchkiss machine gun. He made many improvements in projectiles and heavy ordnance. He died in 1885.

Hothouse, a building for the cultivation of plants too delicate to grow in the open air. It is built chiefly of glass, and resembles a greenhouse in its structure and arrangements, except that artificial heat is kept up all the year round.

Hot Springs, a city and noted health resort, capital of Garland county, Arkansas, 56 miles s. w. of Little Rock. The springs number 70, their water varying from 76° to 158° F. It is clear, tasteless and odorless, and is credited with curing rheumatism, gout, neuralgia and other chronic diseases. Fine novaculite (oilstone) is found here, and hones are manufactured. Lead and silver also occur. Pop. 14,434.

Hotspur. See *Percy.*

Hottentots (hot'en-totz), a peculiar African race, supposed to be the aboriginal occupants of the south end of Africa, at and near the Cape of Good Hope. Their limits may be said to have been the river Orange on the north and northeast, and the Kei on the east. When young they are of remarkable symmetry; but their faces are ugly, and this ugliness increases with age. The complexion is a pale olive, the cheek-bones project, the chin is narrow and pointed, and the face consequently is triangular. The lips are thick, the nose flat, the nostrils wide, the hair woolly, and the beard scanty. When the Dutch first settled at the Cape in the middle of the seventeenth century the Hottentots were a numerous nation, of pastoral and partially nomadic habits, and occupied a territory of 100,000 square miles. At the present day this race is nearly extinct within the wide territory which formerly belonged to it, having been entirely hunted out and dispersed by the Boers. Among the offshoots of the Hottentot race are the Griquas, descended from Hottentot mothers and Dutch fathers, living to the north of the Orange river. They are semicivilized, and have some towns and villages. The Koras or Korannas, higher up the river Orange or Gariep, still remain a favorable specimen of the Hottentot race. They are taller, stronger, and more cleanly than the tribes further west. Other tribes are the Gonas or Gonaquas, much mixed with the Amakosa Kaffirs; the Namaquas, dwelling towards the mouth of the river Orange; the Hill Damaras, farther north. The Bosjesmen or Bushmen are a degraded tribe of Hottentots. The language of the

Hottentots is peculiar, consisting of a system of clicks or clucks.

Hottentot's Bread. See *Testudinaria.*

Houghton (hō'tun), RICHARD MONCKTON MILNES, LORD, only son of Robert Pemberton Milnes, of Fryston Hall and Great Houghton, was born in Yorkshire in 1809, and educated at Cambridge. He made some reputation as a writer of verse, essays, memoirs, etc., but it was rather his social and conversational powers, and his kindly patronage of literary aspirants, than the merit of his writings which gave him his prominent position in London society. In 1837 he entered parliament as member for Pontefract, at first as a Tory, but afterwards as a supporter of Russell and Palmerston. He was an active member of numerous learned societies and institutions, president of the Royal Society of Literature, trustee of the British Museum, foreign secretary of the Royal Academy, etc. He died in 1885.

Houghton, a village, capital of Houghton County, Michigan, on the S. shore of Portage Lake, from which is a ship canal to Lake Superior. It is the seat of very productive copper mines, with smelters. The Michigan College of Mines is located here. Pop. 5113.

Houghton-le-Spring, a market town of England, in the county of Durham, 6½ miles N. E. of Durham. The prosperity of the town depends on the numerous coal mines in the neighborhood. Pop. (1911) 9753.

Houlton, a village, capital of Aroostook County, Maine, 10 miles W. of Woodstock, N. B. It has a trade in farming and lumber products and starch is produced. Pop. 5845.

Houma, a town, capital of Terrebonne County, Louisiana, 70 miles S. W. of New Orleans. It is in a sugar-cane and rice country, and sugar and molasses are produced. Pop. 5024.

Hound (*Canis sagax*), a name given generally to hunting dogs, but restricted by scientific writers to such as hunt by scent, a definition which excludes the greyhound. Among the varieties are the bloodhound, staghound, foxhound, harrier and beagle. Hounds are distinguished not only by their fineness of scent, but by docility and sagacity. Of the rough-haired and smooth-haired varieties, the former manifest the greatest affection for man.

Hounds-tongue, a plant, so called from the shape of its leaves. See *Cynoglossum.*

Hounslow (hounz'lō), a town of England, in Middlesex, 9 miles southwest of Hyde Park Corner, London. The adjoining Hounslow Heath, once notorious for the highway robberies

Deerhound (*Canis sagax*).

committed on it, is now entirely enclosed, and is the site of large cavalry barracks and extensive powder mills.

Hou-Pe (hö-pā'), HU-PEH, or HOO-PE (North of the Lakes), a central province of China. It is intersected by the Han-kiang and the Yang-tse-kiang, and is considered one of the most fertile parts of the empire. Area, about 70,000 sq. miles. Pop. estimated at 34,000,000.

Hour (our), the twenty-fourth part of a day (see *Day*). In most countries the hours are counted from midnight to mid-day, and twelve hours are twice reckoned. But in some parts of Italy twenty-four hours are counted, beginning with sunset, so that noon and midnight are every day at different hours. Each hour is divided into sixty minutes, and each minute into sixty seconds.

Hour-circle. See *Globe.*

Hour-glass, an instrument for measuring time, consisting usually of two hollow bulbs placed one above the other, and having a narrow neck of communication through which a certain quantity of dry sand, water, or mercury is allowed to run from the upper to the lower bulb, the quantity of sand being adjusted so as to occupy an hour in passing from one bulb to the other. The hour-glass was commonly used in churches during the sixteenth and seventeenth centuries to regulate the length of the sermon.

Houris (hou'riz or hö'riz), the 'black-eyed' nymphs of Paradise, whose company, according to the *Koran*, is to be one of the rewards of the faithful. They are described as most beautiful virgins, endowed with perpetual

youth, and subject to no impurity. They dwell in beautiful gardens, by flowing streams, and the meanest of the faithful will have at least seventy-two of them.

Hours. See *Horæ.*

Hours, CANONICAL. See *Horæ canonicæ.*

House Boat, a form of summer water residence now very popular. It consists of a flat-bottomed scow or float, on which is built a superstructure of several rooms, with balconies, awnings, etc., and often luxuriously furnished. During the pleasant season the house boat is moved from place to place on inland waters as desired. House boats are growing rapidly in favor in the United States and are very common on the Thames and some other rivers of England.

House-breaking. See *Burglary.*

Housefly. See *Fly.*

Household Gods, among the Romans, deities known as the Lares and Penātes, and presiding over the fortunes of the house or family.

Household Suffrage, suffrage based on the occupancy of a house or a distinct part of a house for not less than a year. In Britain it was established in boroughs by the Reform Act of 1867, and extended to the counties in 1884. Lodgers occupying lodgings which would let unfurnished for £10 a year are also entitled to rank under this suffrage.

Household Troops. See *Guards.*

Houseleek (hous'lēk; *Sempervīvum tectōrum*, nat. order Crassulaceæ), a succulent plant, commonly to be met with on old walls, the roofs of cottages, etc. The stem rises to the height of 8 or 10 inches, and bears a few purplish flowers, which have twelve or fifteen petals. The leaves are applied by the common people to bruises and old ulcers.

Housemaid's Knee, an acute inflammation of the bursa or sac between the knee-pan and the skin, so called because it is common among housemaids from their kneeling on hard, damp stones. It is treated like other local inflammations by fomentations, and if necessary leeches. Mild purgatives are also useful, and the limb ought to have complete rest.

House of Commons. See *Britain;* —section Parliament; also *Parliament.*

House of Correction, a prison for idle and disorderly persons, and certain classes of criminals, such as prisoners convicted of felony or misdemeanor, vagrancy, etc., or committed on charge of such. Originally vagrants, trespassers and convicted persons were detained in these houses that they might be compelled to work. They are sometimes called *bridewells.* In England every county must have one. They have been adopted in the large cities of the United States.

House of Governors, the suggestion of such a body of public officials appears to have first come from William George Jordan, of New York, who in 1907 published a pamphlet recommending an annual convention of the governors of the several States of this country, to be known as the 'House of Governors,' with the purpose of bringing about harmony in State legislation and the closer unity of the States in all particulars. A practical step was taken toward the realization of this project when President Roosevelt called such a convention in November, 1907, its immediate purpose being to consider the conservation of the natural resources of the country. The governors of 37 States and Territories attended this convention, and the governors present, at their own instance, arranged for a second convention, to be held in January, 1910, its purpose being to consider the subject of uniform legislation, and also to adopt measures for annual or biennial sessions thereafter, under the suggested title of House of Governors, with the idea of bringing about, through the action of the States themselves that harmony of action which the general government has of late been striving to develop. A session was held at Spring Lake, N. J., in September, 1911, and steps were taken towards establishing a permanent headquarters, with a library of State Statutes.

House of Lords. See *Britain;* also *Parliament.*

House of Representatives. See *Congress.*

Houssa, or HAUSSA (hous'sa), a region of Africa, in Central Soudan, between lat. 11° and 14° N.; and lon. 4° and 11° E. This country, though yet little known, is represented as extremely fertile, and skilfully cultivated. It is under the rule of the Fellatahs, who have subjected the native inhabitants, the Haussana or Haussas, a race intermediate between the negroes and the Berbers, but generally ranked with the

latter. They are intelligent and lively, expert weavers as well as agriculturists, and well acquainted with tanning and working in iron. Their language is rich and sonorous, and has become the general medium of commercial intercourse in Central Africa. They are Mohammedans. There are two large towns in Houssa—Sokoto and Kashna.

Houston (hūs'tun), a city of Texas, capital of Harris county, at the head of steamboat navigation on Buffalo Bayou, 48 miles northwest of the

important seaport of Galveston, and the great railway center of the State. It stands in an excellent grazing district, and contains iron-foundries, cotton-presses, machine-shops, car-wheel works, and other industrial establishments. It is a great shipping port for cotton, and rice and lumber are also shipped. Pop. 78,800.

Houston, Samuel, President of Texas, was born in Virginia in 1793, of Scotch-Irish descent. He was taken to Tennessee in childhood, studied law and practiced at Nashville, and became prominent in the State. being elected to Congress in 1823, and made governor in 1827. He subsequently resigned this office, lived several years among the Cherokee Indians, and in 1832 went to Texas. Here he was active in the revolt of Texas against Mexico, was chosen commander of the army and in 1836 defeated the Mexicans at San Jacinto, which resulted in the independence of Texas, of which he was elected President. In 1845 Texas entered the Union, and Houston was chosen United States Senator. He was elected Governor of Texas in 1859. In 1861 he was deposed for adherence to the Union. He died in 1863.

Houston Heights, a town in Harris County, Texas, 54 miles N. W. of Houston. Its industries include furniture and cotton-seed oil. Pop. 6984.

Hovenden (h u v'en-den), Thomas, painter, born at Dunmanway, Ireland, in 1840, studied art at Cork and in New York, was elected a member of the National Academy in 1882. His *Breaking the Home Ties* was very popular. Other pictures were *The Last Moments of John Brown*, *Elaine*, *A Breton Interior*, etc. He was killed while trying to save a little girl from a railroad train, in 1895.

Howard (hou'ard), the patrician house that has been for centuries at the head of the English nobility. The first of the family of whom anything is certainly known is Sir William Howard, chief-justice of the common pleas under Edward I and Edward II. His grandson, Sir John Howard, possessed extensive property in Norfolk, and was also sheriff of the county. His grandson, Sir Robert Howard, by marrying the co-heiress of the Mowbrays, dukes of Norfolk, greatly increased the family possessions, and enhanced the family importance. Their only son, Sir John Howard, distinguished himself in the wars with France in 1452-53, and in 1470 was created Lord Howard, and made captain-general of the royal forces at sea. Adhering to the fortunes of Richard III he was in 1483 created Duke of Norfolk, and elevated to the high dignity of Earl-marshal of England, but two years after he was killed at Bosworth Field, and his blood and honors were attainted by parliament, 1485. A like attainder was decreed against his son Thomas, who had been created Earl of Surrey by Richard. Thomas, however, was restored to his titles and possessions, manifested high military talent, and distinguished himself, especially by his defeat of James IV of Scotland at Flodden in 1513. His son Thomas, third duke of Norfolk, obtained distinction both as a naval and military commander, and became High-admiral of England. But in spite of his services both at home and against the Scots and the French, Henry VIII at last condemned him, on slight grounds, to suffer the death of a traitor. The death of Henry prevented the execution, and he was reinstated in his rank and property by Queen Mary, and died in August, 1554. By his marriage with a daughter of Edward IV he became the father of the ill-fated and ac-

complished Henry Howard, Earl of Surrey, the best English poet of his age. (See *Surrey, Earl of.*) Thomas, fourth duke of Norfolk, entertained the project of marrying Mary Queen of Scots, which led to him being convicted of high treason, and beheaded in 1572. The attainder was reversed and the family honors restored, partly by James I and partly by Charles II. The ducal house of Norfolk has thrown out many branches which have enjoyed, or still enjoy, the earldoms of Carlisle, Suffolk, Berkshire, Northampton, Arundel, Wicklow, Norwich and Effingham, and the baronies of Bindon, Howard de Walden, Howard of Castle Rising, and Howard of Glossop. As connected with this noble family we may mention Lord Howard of Effingham, who defeated the Spanish Armada in 1588; Catherine Howard, one of the ill-fated consorts of Henry VIII; and Sir Thomas Howard, who died in the Tower a prisoner, for having aspired to the hand of the Lady Margaret Douglas, daughter of Margaret, queen-dowager of Scotland, and niece of Henry VIII. 'The blood of the Howards' has become proverbial, as expressive of ancient lineage combined with high rank.

Howard, Bronson, playwright, born at Detroit, Michigan, in 1842; died in 1908. His best-known plays are *Saratoga, Young Mrs. Winthrop, Shenandoah* and *The Banker's Daughter.*

Howard, John, an English philanthropist, was born in 1726; and died in 1790. His father, a wealthy London tradesman, died when his son was about 19 years of age, and left him an independent fortune. In 1756 Howard undertook a voyage to Lisbon to view the effects of the recent earthquake. The vessel in which he embarked being captured, he was consigned to a French prison. The hardships he suffered and witnessed previously to his release first roused his attention to the subject of his future researches. In 1773 he resolved to devote his time to the investigation of the means of correcting the existing abuses in the management of prisons. With this view he visited most of the English county jails and houses of correction, and in March, 1774, he laid the result of his inquiries before the House of Commons, for which he received a vote of thanks. In 1775 and 1776 he visited many of the continental prisons, as well as those of Scotland and Ireland, and the substance of his investigations appeared in a work he published in 1777. This work was supplemented by his experiences of foreign prisons (1778-1783). In 1789 he published an *Account of the Principal Lazarettos in Europe,* with notes on Continental and British prisons and hospitals. In the same year he made a final journey through Germany and Russia, when prisons and hospitals were everywhere thrown open for his inspection as a friendly monitor and public benefactor. He died of fever at Cherson in South Russia.

Howard, Oliver Otis, soldier, born at Leeds, Maine, in 1850; died in 1909. He graduated at West Point, served in the Seminole war and through the Civil war, being made major-general of volunteers in 1862, commander of the Department of Tennessee in 1864, brigadier-general in the regular army in 1864, and major-general in 1886. He was commissioner of the Freedman's Bureau 1865-74, and Peace Commissioner to the Indians of Arizona and New Mexico in 1872. He retired in 1894.

Howard University, an institution established at Washington, D. C., in 1867, by Gen. Oliver O. Howard, while in charge of the Freedman's Bureau, for the liberal education of freedmen. As now conducted pupils are admitted without distinction of sex or color. In addition to the college course, there are courses in medicine, dentistry, pharmacy, law, theology and normal instruction. It has 105 instructors, 1200 students, a library of 30,000 volumes and an endowment of about $280,000.

Howe, Edgar Ward, novelist, born near Huntington, Iowa, in 1854. His chief works are *A Story of a Country Town, The Mystery of the Locks, Confession of John Whitlock,* etc. Editor and publisher of the *Atchison Daily Globe.*

Howe, Elias, an eminent inventor, was born at Spencer, Massachusetts, in 1819; died in 1867. After long experiment he succeeded in 1846 in perfecting a sewing machine, the first satisfactory one ever invented and the basis of all those that have followed. He was for several years involved in expensive and harassing lawsuits to establish his right to reap the benefits of his own ingenuity, but obtained a verdict in his favor in 1854, and subsequently grew wealthy from the royalties paid on his patent. He equipped a regiment at his own expense in the Civil war, and served in it as a private. Immense numbers of the Howe sewing machines are now manufactured and sold in America, Great Britain, and elsewhere.

Howe, Julia Ward, author and poet, was born in New York city

in 1819. She received a careful education, and at an early age wrote plays and poems. She was married to Dr. Samuel G. Howe, philanthropist, in 1843. She afterward continued her studies, writing philosophical essays. In 1861 she composed the popular *Battle Hymn of the Republic*, the favorite lyric of the Civil war. She espoused the woman suffrage movement in 1869, was made president in 1872 of the New England Women's Club, and presided at times over the Woman Suffrage Association. She published two volumes of poems, *Passion Flowers* and *Words for the Hour;* also a *Life of Margaret Fuller*, and other prose works. She continued active in such pursuits till an advanced age, dying in 1910, at the age of ninety-one.

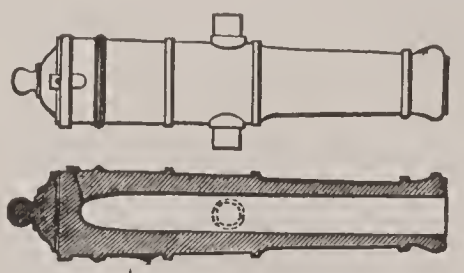
Howe, Richard, Earle Howe, an English admiral, was the second son of Emanuel Scrope, second Viscount Howe, and was born in 1725; died in 1799. He joined the navy at the age of fourteen, and in 1745 obtained the command of the *Baltimore* sloop of war. In 1758 he reduced Cherbourg. Having greatly distinguished himself on many occasions, he was, in 1782, created an earl. In 1783 he accepted the post of first lord of the admiralty. In 1797 Lord Howe exerted himself with great success to quell the mutiny among the seamen at Portsmouth.

Howells (how'elz), William Dean, novelist, was born at Martinsville, Ohio, in 1837. He learned the printer's trade with his father; was afterwards assistant editor on the *Ohio State Journal;* published a life of Abraham Lincoln and a volume of poems, and was appointed in 1861 consul at Venice. On his return to America in 1865 he joined the staff of the *Nation*, became afterwards editor of the *Atlantic Monthly* (1871-81), was editorial contributor to *Harper's Magazine*, 1886-91; editor for a time of the *Cosmopolitan*, and subsequently editor of the *Easy Chair of Harper's.* He became widely known as a writer of realistic novels. Among his many works are *Venetian Life* (1866), *Italian Journeys* (1867), *A Chance Acquaintance* (1873), *The Lady of the Aroostook* (1879), *A Modern Instance* (1883), *The Rise of Silas Lapham* (1885), *Literature and Life* (1902), *London Films* (1905), *Between the Dark and the Daylight* (1907), etc.

Howitt (how'it), Mary, an English writer, born in 1805, the daughter of Mr. Botham, a Quaker; was married in 1823 to Mr. William Howitt (see next article). Mary Howitt wrote a number of hymns and ballads, several volumes in prose and verse for children, and translated Miss Bremer's works and H. C. Andersen's *Improvisatore.* Among her writings for the young may be mentioned *The Children's Year, The Dial of Love, A Treasury of Tales for the Young*, etc. In conjunction with her husband she also wrote *The Literature and Romance of Northern Europe* and *Ruined Abbeys of Great Britain.* She died in 1888.

Howitt, William, born in 1792 of a Quaker family; began early to publish verses, and in conjunction with his wife (see above article) published shortly after their marriage a volume of poems—*The Forest Minstrel* (1823). In 1831 appeared his *Book of the Seasons*, in 1834 his *History of Priestcraft*, and in 1838 his popular *Rural Life in England.* In 1840 the Howitts settled at Heidelberg, and devoted themselves to introducing the literature of the north, especially of Sweden, to English readers. *Student Life in Germany* appeared in 1841, *Rural and Domestic Life in Germany* in 1842. In 1847 Mr. Howitt published his *Homes and Haunts of the British Poets*, and, after a visit to Australia, his *Land, Labor and Gold;* and *The History of Discovery in Australia.* He also wrote a *History of England.* In later life Mr. Howitt and his wife became converts to spiritualism. He died in 1879.

Howitzer (hou'it-ser), a short piece of ordnance, usually having a chamber for the powder narrower than the bore, specially designed for the horizontal firing of shells with



Brass Howitzer (24 pounder).

small charges, combining in some degree the accuracy of the cannon with the calibre of the mortar, but much lighter than any gun of the same capacity. The rifled gun, throwing a shell of the same capacity from a smaller bore, and with much greater power, has superseded the howitzer for general purposes.

Howler Monkey (*Mycētes*), a genus of South American monkeys, characterized by a remarkable loudness of voice, which is due to the presence of a large chamber within the hyoid bone and the enlarge-

ment of the ventricles of the larynx. In the tropical forests of America their hideous howls, probably a kind of amorous concert, may be heard during the night more than a mile away. They are prehensile-tailed, large and heavy of body, with a high pyramidal head flattened on the summit.

Howrah (hou'rä), a town of India, on the right bank of the Hugli, opposite Calcutta, of which it is practically a suburb, and with which it communicates by a floating bridge. It has large dockyards, jute and saw mills, and various manufactories. Pop. 157,-594.

Höxter (heuk'stėr), a town of Westphalia, Prussia, on the left bank of the Weser, once a Hanse town. Pop. 7699.

Hoy (hoi), a small vessel, usually rigged as a sloop, and employed in carrying goods and passengers short distances coastwise, and sometimes in conveying goods to and from larger vessels and the shore.

Hoy, an island of the Orkneys, Scotland, 3½ miles S. of Stromness. It is about 13 miles long and 6 broad; mountainous and healthy, but with fertile tracts. It has an excellent harbor, Long Hope. At the southwest of the island there is a detached pillar of rock 450 feet high, known as the Old Man of Hoy. Pop. 1380.

Hoya (hō'ya) a genus of Asclepiadaceæ, common in tropical Asia, and cultivated in hothouses on account of their ornamental appearance.

Hubbard, Elbert, author and publisher, born at Bloomington, Illinois, in 1859. He founded at East Aurora, New York, the famous Roycroft shop, devoted to making de luxe editions of the classics. He is editor of the *Philistine* and the *Fra*, radical and free-spoken journals, and has written *No Enemy but Himself*, *Little Journeys to the Homes of Famous Women*, etc.

Huamanga. See *Guamanga.*

Huanaco (hua-na'kō). See *Guanaco.*

Huanu'co Bark, the gray or silver cinchona bark imported in the form of quills from around Huanuco in Peru. It is the produce of *Cinchona micrantha.*

Hubble-bubble. See *Narghile.*

Huber (hö'ber), François, a Swiss naturalist, born in 1750; died in 1831. Notwithstanding the loss of his eyesight, he was able, by the help of his wife and his reader and amanuensis, to make observations and deductions which constitute decidedly the most important contribution by any one man to our knowledge of bees. His first work was published in 1792 under the title of *Lettres à Ch. Bonnet.* Four years after his *Nouvelles Observations sur les Abeilles*, practically a new edition, enlarged and amended of the other, appeared. His son Pierre also assisted his father, and himself published important observations on ants.

Hubert (hö'bert), St., the patron of huntsmen. He was of a noble family of Aquitaine. While hunting in the forests of Ardennes he had a vision of a stag with a shining crucifix between its antlers, and heard a warning voice. He was converted, entered the church, and eventually became Bishop of Maestrich and Liége. He worked many miracles, and is said to have died in 727 or 730.

Hubertsburg (hö'bertz-burg), formerly a hunting seat of the electors of Saxony, in the Leipzig district, now enlarged and divided into portions, used respectively as a public prison, a hospital, a lunatic asylum, etc. Here the Peace of Hubertsburg, which put an end to the Seven Years' war, was signed February 15, 1763.

Huc (ük), Evariste Regis, a French missionary and traveler, born in 1813. After studying theology, about 1837 he entered the order of the Lazarist Fathers, was ordained in 1838; in 1839 went to China as a missionary, and in company with Père Gabet made a journey of exploration in the interior of the empire and of Tibet. After this he returned in broken health to France, where he published *Travels in Tartary, Tibet and China*, a work which attained a wide popularity. He afterward published *The Chinese Empire* and *Christianity in China.* He died in 1860.

Huckleberry (huk'l-ber-i), an American name for the whortleberry (which see).

Huddersfield (hud'erz-fēld), a flourishing manufacturing town, in the West Riding of Yorkshire, England, 16½ miles southwest of Leeds. Among its institutions are two colleges for higher education, a technical school, etc. The town is the chief center of the fancy woolen trade. Broadcloths, doeskins, trouserings are also manufactured, and there are manufactories of steam engines, etc. Pop. 107,825.

Hudson (hud'sun), a town of Middlesex county, Massachusetts, 28 miles W. of Boston. It has manufactures of leather, rubber shoes,

webbing, gossamers, paper boxes, lasts, etc. Pop. 6743.

Hudson, a city, capital of Columbia county, New York, on the E. bank of the Hudson River, 28 miles S. of Albany. It contains a State Armory, House of Refuge for Women and Firemen's Home, and has extensive manufactures, including clothing, paper, carwheels, machinery, etc., with several blast furnaces and iron foundries. It was settled in 1784, and was formerly engaged in the whale fishery and foreign trade. Pop. 11,417.

Hudson, HENRY, an English navigator, date of birth unknown. He sailed from London in the year 1607 in a small vessel, with only ten men and a boy, to discover the Northeast Passage, and proceeded beyond the 80th degree of latitude. In a second voyage he landed at Nova Zembla, but could get no further eastward. In 1609 he sailed for North America, in the service of the East India Company, and discovered the Hudson River, which he ascended about 50 leagues. In 1610 he sailed in an English ship named the *Discovery*, and discovered Hudson Strait and Hudson Bay, where he wintered; but his crew, after suffering many hardships, mutinied and set him adrift in a boat along with his son John and seven of the most infirm of the crew, none of whom were ever again heard of. Hudson published *Divers Voyages and Northern Discoveries* (1607), and a *Second Voyage* (1608).

Hudson Bay, or HUDSON'S BAY, an extensive bay, or rather an inland sea, Dominion of Canada, extending between lat. 51° and 64° N., and lon. 77° and 95° W.; length, north to south, about 800 miles; greatest breadth, about 600 miles. Hudson Bay is open to navigation for 4½ months in summer (from middle of June to end of October), but is obstructed by drift-ice during the rest of the year. There are many islands, reefs and sand-banks. The shores on the east are high and bold; but those on the west, especially towards the south, are low and level. The white whale is found in its waters, and there is a considerable summer fishery.

Hudson Bay Company, an English trading company, chartered by Charles II. May 2, 1670. It had long a monopoly of the trade throughout the whole territory of North America whose streams flow into Hudson Bay, and at one time as far westward as the Pacific, with rights of governing and making war. In 1870 its authority was transferred by act of Parliament to the crown, and its territories incorporated in the Dominion of Canada. Its trade in furs is still very large. See *Fur Trade*.

Hudson Bay Territory.

See *Northwest Territories*.

Hudson Falls, a village in Washington county, New York. Pop. 5189.

Hudson River, a river on the Atlantic coast of the United States. It rises, by two branches, in the northern part of the State of New York, in the Adirondack Mountains, about lat. 44° N. Two small streams unite to form the river, which is afterwards joined by the Schroon and Sacondaga. At Glen's Falls it has a fall of 50 feet, after which it runs almost due south to its mouth in New York Bay. Its whole course is over 300 miles; it is navigable as far as Albany, 145 miles, for the largest vessels. The banks of the Upper Hudson are high and rocky; and the scenery very picturesque. It was discovered in 1609 by Henry Hudson, after whom it was named.

Hué (hö-ā′), the capital city of Anam, on the river Hué, which is here navigable for small craft, 10 miles from its mouth in the Gulf of Tonquin. It was fortified in the present century in European style by French officers in the service of the king of Cochin-China. The circumference of the walls is upwards of 5 miles. The city has a considerable trade. Pop. 42,000.

Hue and Cry, in English law, the pursuit of a felon or offender, with loud outcries or clamor to give an alarm. This procedure is taken by a person robbed, or otherwise injured, to pursue and get possession of the culprit's person. At common law, a private person who has been robbed, or who knows that felony is committed, is bound to raise hue and cry under pain of fine and imprisonment. This is generally done by informing the nearest constable; and this process is still recognized by the law of England as a means of arresting felons without the warrant of a justice of the peace. The same name is also applied to a paper circulated by the secretary of state for the home department announcing the perpetration of offenses.

Huelva (u̯-el′vå), a seaport town of Southwestern Spain, capital of the province of same name in Andalusia. It has wide and well-built streets. There are manufactures of matting, ropes, sails, etc., a large trade in the exportation of copper ore; also in fruits and wine. The fisheries, mainly sardine and tunny, are

of considerable value. Pop. 21,357.—The province of Huelva is mountainous and well wooded in the north, and contains celebrated copper mines. In the south

it is comparatively level, and has a rich alluvial soil. Pop. 260,880.

Huet (ü-ā), PIERRE DANIEL, a French critic and classical scholar, was born at Caen, Normandy, in 1630. In 1670 he superintended the celebrated Delphin series (*adusum Delphini*) of the Latin classics. Having taken holy orders, he was made Abbot of Aulnai, and subsequently nominated Bishop of Soissons, which see he exchanged for that of Avranches, but latterly retired to an establishment of the Jesuits at Paris, where he died in 1871.

Huggins (hug'inz), SIR WILLIAM, an eminent English astronomer, born in London in 1824. He gained distinction by his discoveries with the spectroscope on the sun and stars. He was president of the Royal Astronomical Society 1876-78, and of the British Association 1891-92. He died May 14, 1910.

Hugh Capet. See *Capet.*

Hughes (hūz), CHARLES EVANS, governor and supreme court justice, was born at Glens Falls, New York, in 1862. He was graduated from Brown University and Columbia Law School, was professor of law at Cornell University 1891-93, lecturer 1893-95, and at New York Law School after 1893. In 1905 he became counsel on the Armstrong investigations of life insurance companies, and developed very serious evils in the conduct of these institutions. His excellent work in this investigation brought him the nomination for governor of New York, and he was elected in 1906, and again in 1908. He was appointed a justice of the United States Supreme Court by President Taft in 1910.

Hughes, JOHN, archbishop, was born in County Tyrone, Ireland, in 1798. He came to the United States in 1817 and was ordained priest in 1826. In 1838 he became coadjutor bishop of New York, bishop in 1847, and its first archbishop in 1850. In 1861 he was entrusted by President Lincoln with a special mission to France in behalf of the Union cause. He was the founder of St. John's College, Fordham, and of St. Patrick's Cathedral. He died in 1864.

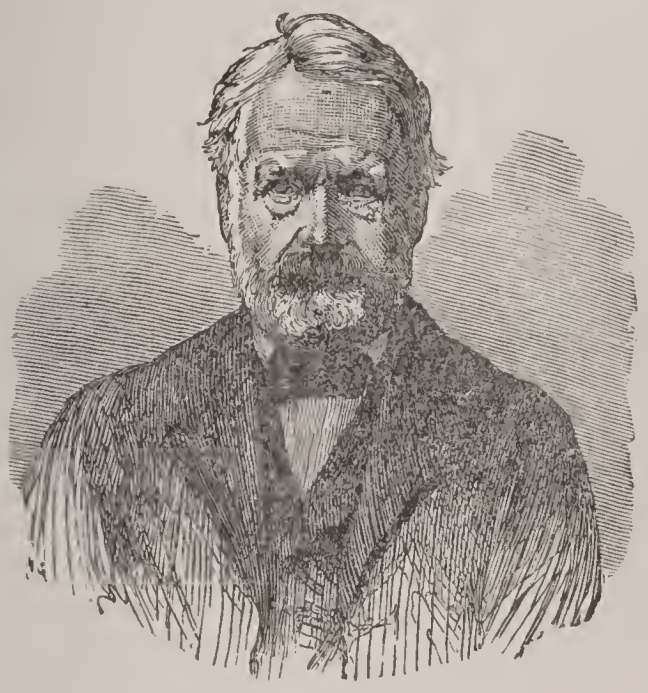
Hughes, THOMAS, an English barrister, author and philosopher, born at Uffington, Berkshire, in 1823. He was educated at Rugby under Dr. Arnold, and afterwards at Oxford. In 1848 he was called to the bar, and in 1869 became a queen's counsel. He is widely known by his popular novel, *Tom Brown's School-days*, a picture of school life at Rugby, published in 1856. It was followed by *Tom Brown at Oxford* (1861), *A Layman's Faith* (1868), *Alfred the Great* (1869), *The Manliness of Christ*, and other writings. He gave very much of his time to the work of social elevation of the working-class, encouraging in particular the coöperative system. In 1865 he was returned as a member for Lambeth, and in 1868 for Frome, which he continued to represent till 1874. In 1880 he established a colony in Tennessee, which he named Rugby. He died in 1896.

Hugli, or HOOGHLY (hög'li), a river of Hindustan, in Bengal, formed by the junction of the Bhagirathi and the Jalangi at Nadija, about 55 miles above Calcutta. It is 15 miles wide at its mouth, but much encumbered by shoals. At Calcutta it is about a mile wide, and has rapid and violent tides. The southwest monsoons produce a 'bore' in the Hugli, that is, a tidal wave which rushes up the river at the rate of 15 or 20 miles an hour. Ships drawing 17 feet ascend as far as Calcutta. Total course about 200 miles.

Hugli, a town of Hindustan, in Bengal, on the Hugli River, 22 miles north from Calcutta. Hugli is said to have been founded by the Portuguese in 1537. It was made the seat of a British factory in 1676, but declined in importance as Calcutta rose. An important iron railway bridge connecting the East India railway system with that of the Eastern and Northern Bengal rail-

way crosses the river near the town. Pop. 29,383.

Hugo (ü-gō), Victor Marie, a French poet and novelist, born in 1802, at Besançon, where his father, then Major Hugo, was stationed in command of a brigade. His father having entered the service of Joseph Bonaparte, king of Italy, and afterwards of Spain, Victor's earlier years were partly spent in those countries, but in 1812 he went with his



Victor Hugo.

mother to Paris. At the age of twelve he was already writing verses, and in 1823 his first novel, *Han d'Islande*, appeared, followed in 1825 by *Bug Jargal*. In 1828 a complete edition of his *Odes et Ballades* appeared. In these productions Hugo's anticlassical tendencies in style and treatment of his subject had been very visible, but the appearance of his drama *Cromwell* (1827), with its celebrated preface, gave the watchword to the anticlassical or romantic school. *Cromwell* was too long for representation, and it was only in 1830 that *Hernani*, over which the great contest between Classicists and Romanticists took place, was brought on the stage. Other dramas followed:—*Marion Delorme* (1831), *Le Roi s'amuse* (1832), *Lucrèce Borgia* (1833), *Marie Tudor* (1833), *Angelo* (1835), *Ruy Blas* (1838), *Les Bourgraves* (1843). During those years he had also published a novel, *Nôtre Dame de Paris* (1830), and several volumes of poetry, *Les Feuilles d'Automne* (1831), *Les Chants du Crépuscule* (1835), *Les Voix Intérieures* (1837), *Les Rayons et Les Ombres* (1840). His poetry of this period has a melody of grace superior perhaps to any that he afterwards wrote, but wants that deep and original sense of life which is characteristic of his later poems. During the same period he also wrote his critical essays on Mirabeau, Voltaire, and a number of articles for the *Revue de Paris*. In 1841, after having been twice previously rejected, he was elected a member of the French Academy; made shortly afterwards a tour in the Rhineland, of which he wrote a brilliant and interesting account in *Le Rhin*, published in 1842. In 1845 he was made a peer of France by Louis Philippe. The revolution of 1848 threw Hugo into the thick of the political struggle. At first his votes were decidedly Conservative, but afterwards, whether from suspicion of Napoleon's designs or from other reasons, he became one of the chiefs of the democratic party. After the *coup d'état*, December 2, 1851, he was one of those who kept up the struggle in the streets against Napoleon to the last. He then fled to Brussels, where he published the first of his bitter satires on the founder of the Second Empire, *Napoléon le Petit*. In the following year (1853) the second, the famous volume of *Les Châtiments*, a wonderful mixture of satirical invective, lyrical passion and pathos appeared. Hugo now went to live in Jersey, was expelled along with the other French exiles in 1855 by the English government, and finally settled in Guernsey. It was in the comparative solitude and quietness of the Channel Islands that he wrote most of the great works of his later years, *Les Contemplations* (1856), *La Légende des Siècles*, 1st series (1859), *Chansons des Rues et des Bois* (1865), and his celebrated series of social novels, *Les Misérables* (1862), *Les Travailleurs de la Mer* (1866), and *L'Homme qui Rit* (1869). In 1870, after the fall of the Empire, Victor Hugo returned to Paris, where he spent the remaining years of a remarkably vigorous old age in occasional attendances at the senate, and in adding to the already long list of his literary works. Among these latest productions we may mention *Quatre-vingt-treize* (1872), *L' Art d' être Grand-père* (1877), *L'Histoire d'un Crime* (1877), *Le Pape* (1878), *La Pitie Suprême* (1879), *Religions et Religion* (1880), *Les Quatre Vents de l'Esprit* (1881), *La Légende des Siècles* (last series 1883), *Torquemada* (1882). He died in 1885.

Huguenots (hū'ge-nots), a term of unknown origin, applied by the Roman Catholics to the Protestants of France during the religious struggles of the sixteenth and seventeenth centu-

ries. During the early part of the sixteenth century the doctrines of Calvin, notwithstanding the opposition of Francis I, spread widely in France. Under his successor, Henry II, 1547-59, the Protestant party grew strong, and under Francis II became a political force headed by the Bourbon family, especially the King of Navarre and the Prince of Condé. At the head of the Catholic party stood the Guises, and through their influence with the weak, young king, a very long conflict with the Huguenots commenced. The result was that a Huguenot conspiracy, headed by Prince Louis of Condé, was formed for the purpose of compelling the king to dismiss the Guises and accept the Prince of Condé as regent of the realm. But the plot was betrayed, and many of the Huguenots were executed or imprisoned. In 1560 Francis died, and during the minority of the next king, Charles IX, it was the policy of the queen mother, Catharine de Medici, to encourage the Protestants in the free exercise of their religion in order to curb the Guises. But in 1562 an attack on a Protestant meeting made by the followers of the Duke of Guise gave rise to a series of religious wars which desolated France almost to the end of the century. Catharine, however, began to fear that Protestantism might become a permanent power in the country, and, making an alliance with the Guises, she suddenly projected and carried out the massacre of St. Bartholomew's (August 24, 1572). The Protestants fled to their fortified towns and carried on a war with varying success. On the death of Charles IX, Henry III, a feeble sovereign, found himself compelled to unite with the King of Navarre, head of the house of Bourbon and heir-apparent of the French crown, against the ambitious Guises, who openly aimed at the throne, and had excited the people against him to such a degree that he was on the point of losing the crown. After the assassination of Henry III, the King of Navarre was obliged to maintain a severe struggle for the vacant throne; and not until he had, by the advice of Sully, embraced the Catholic religion (1593), did he enjoy quiet possession of the kingdom as Henry IV. Five years afterwards he secured to the Huguenots their civil rights by the Edict of Nantes, which confirmed to them the free exercise of their religion, and gave them equal claims with the Catholics to all offices and dignities. They were also left in possession of the fortresses which had been ceded to them for their security. This edict afforded them the means of forming a kind of republic within the kingdom, which Richelieu, who regarded it as a serious obstacle to the growth of the royal power, resolved to crush. The war raged from 1624 to 1629, when Rochelle, after an obstinate defense, fell before the royal troops; the Huguenots had to surrender all their strongholds, although they were still allowed freedom of conscience under the ministries of Richelieu and Mazarin. But when Louis XIV and Madame de Maintenon set the fashion of devoutness, a new persecution of the Protestants commenced. They were deprived of their civil rights, and bodies of dragoons were sent to the southern provinces to compel the Protestant inhabitants to abjure their faith. The Edict of Nantes was revoked in 1685, and by this act more than 500,000 Protestant subjects were driven out, to carry their industry, wealth, and skill to other countries. In the reign of Louis XV a new edict was issued repressive of Protestantism, but so many voices were raised in favor of toleration that it had to be revoked. Louis XVI, in 1787, first put the Protestants on an equality with the Catholics.

Huia-bird (hwē'a-berd), the native name of a genus of New Zealand starlings, *Heteralocha acutirostris* or *Neomorpha Gouldii*, comprising a single species of birds, occupying a very limited space in a few densely-wooded mountain ranges. The plumage is a very dark green, appearing to be black in some lights, the tip of the tail white. The most striking peculiarity about this bird is that the male has a stout, straight beak; the female a long, slender, curved bill.

Hulk, the name applied to old ships laid by as unfit for further sea-going service, and used as depots for coals, sailors, etc.

Hull, Isaac, naval officer, born at Derby, Connecticut, in 1775; died in 1843. He became a naval officer in the United States service. In July, 1812, he escaped by skilful sailing with the frigate *Constitution* from a three days' chase by a British squadron, and on August 19 met and sunk the British frigate *Guerriere*, after half an hour's fight, with very little loss to his ship or men.

Hull, William, military officer, was born in Derby, Connecticut, in 1753; was governor of Michigan Territory 1801-14, and in 1812 commanded the Northwest army and surrendered Detroit to General Brock without firing a shot. He was court-martialed and sentenced to be shot, but was pardoned on account of his services in the Revolution. He died in 1825.

Hull, a city, capital of Ottawa county, Quebec, Canada, on the Ottawa River, opposite Ottawa city. It has pulp, paper, lumber and other mills, and in the vicinity are iron, phosphate and mica mines. Pop. (1911) 17,885.

Hull, or KINGSTON-ON-HULL, a river port of England, and a county of itself, locally situated in the East Riding of York at the influx of the Hull into the estuary of the Humber. The town stands on a low and level tract of ground, and stretches along the banks of the Humber, from the inundations of which it is secured by strong embankments. Among the notable public buildings and institutions are the town hall, the new exchange, the corn exchange, dock offices, etc., the royal institution, the public rooms, Hull and East Riding College, Reckitt free library, the infirmary, dispensary, children's hospital, etc. There are three well-laid-out public parks. The industries of the town are varied, comprising flax and cotton mills, shipbuilding, rope and sail works, iron foundries, machine-making, seed-crushing, color-making, oil-boiling, etc.; but its importance arises chiefly from its shipping commerce, Hull being one of the busiest seaports in the kingdom. The docks are among the largest in the kingdom. The railway communications are excellent, not fewer than five railway companies running into the town. It is an ancient town, and was of some importance long before it received its charter from Edward I. It played a conspicuous part during the civil war, being held by the parliamentary forces, and twice besieged without success. Pop. (1911) 278,024.

Hullah (hul'la) JOHN PYKE, an English musician, born in 1813; died in 1884. He entered the Royal Academy of Music in 1832, and attracted some attention by his comic opera, *The Village Coquettes* (1836), which was followed by the *Barber of Bassora* in 1837, and *The Outpost* in 1838. About this time he began to work for the establishment of popular singing schools. He became professor of music at King's College and other institutions in London, and in 1874 inspector of training schools. He wrote some educational and historical works on music, among which are the *Grammar of Harmony*, *Grammar of Counterpoint*, *A History of Modern Music*, etc.

Humanists (hū'man-ists), a party which, during the Renaissance of the sixteenth century, cultivated literature, especially classical literature. Their influence was decidedly in favor of progress and reform, and in this way they may be considered as heralding and coöperating with the great religious reformers. Erasmus is the great type of the humanist, as Luther is of the religious reformer.

Humanitarians (hū - man - i-tā'ri-a n z), a t e r m sometimes applied to the various classes of anti-Trinitarians, who regard Christ as a mere man. Their opinions must not be confounded with Arianism, which admits the preëxistence of Christ, and his preëminence among God's creatures. The term is also applied to the followers of St. Simon, who maintain d the perfectibility of human nature without the aid of supernatural grace.

Humanities (hū-man'i-tēz; Latin, *literæ humaniores*), a term for humble or polite literature, including the study of the ancient classics, in opposition to philosophy and science. In the Scotch universities *humanity* is applied to the study of the Latin language and literature alone.

Humber (hum'bėr), a large river, or rather estuary, on the east side of England, between the counties of York and Lincoln. At its western extremity it is joined by the Ouse, after the latter has been augmented by the Derwent and Aire; below Goole it receives the Don, lower down the Trent, and still lower the Hull from the opposite side. It is about 35 miles long, and varies in breadth from 1 to 7 miles. There is at all times a considerable depth of water in the fair way of the channel, and the navigation is safe and easy.

Humbert I (in Italian, UMBERTO), King of Italy, was born March 14, 1844, eldest son of Victor Emmanuel. In the war of 1866, in which Italy joined Prussia against Austria, he took the field in command of a division, and distinguished himself by his bravery in the disastrous battle of Custozza. In 1868 he married his cousin, Margherita, daughter of Duke Ferdinand of Genoa. He succeeded his father on January 9, 1878. He was assassinated by a pistol shot, July 29, 1900, by Gaetang Bresci, an Italian anarchist, and was succeeded by his son, Victor Emmanuel III.

Humboldt (hụm'bolt), FRIEDRICH HEINRICH ALEXANDER, BARON VON, a German traveler and naturalist, was born in 1769, at Berlin, where his father held the post of royal chamberlain. He studied at the universities of Frankfort-on-the-Oder, Berlin and Göttingen, and also at the commercial academy in Hamburg. His first work was *Observations on the Basalt of the Rhine* (1790). In 1791 he studied min-

ing and botany at the mining school in Freiberg, and subsequently became overseer of the mines in Franconia. In 1797 he resolved to make a scientific journey in the tropical zones along with a friend, Aimé Bonpland. They landed at Cumana, in South America, in July, 1799, and spent five years in exploring scientifically the region of the Orinoco and the upper part of the Rio Negro, the district between Quito and Lima, the city of Mexico and the surrounding country, and the island of Cuba. In 1804 they arrived at Bordeaux, bringing with them an immense mass of fresh knowledge in geography, geology, climatology, meteorology, botany, zoölogy, and every branch of natural science, as well as in ethnology and political statistics. Humboldt selected Paris as his residence, no other city offering so many aids to scientific study, and remained there arranging his collections and manuscripts till March, 1805, after which he visited Rome and Naples in company with Gay-Lussac, but eventually returned to Paris in 1807, when the first volume of his great work, *Voyage aux Régions équinoxiales du Nouveau Continent*, appeared; the thirtieth and last was published in 1827. In 1827 Humboldt, who had been offered several high posts by the government of Prussia, and had accompanied the king on several journeys as part of his suite, was persuaded to give up his residence at Paris and settle at Berlin, where he combined the study of science with a certain amount of diplomatic work. In 1829, under the patronage of the Czar Nicholas, he made an expedition to Siberia and Central Asia, which resulted in some valuable discoveries, published in his *Asie Centrale*. In 1835 he published at Paris his *Examen Critique de la Géographie du Nouveau Continent*. In 1845 appeared the first volume of the *Cosmos*, his chief work, a vast and comprehensive survey of natural phenomena, in which the idea of the unity of the forces which move below the variety of nature is thoroughly grasped. Humboldt died in 1859.

Humboldt, Karl Wilhelm, Baron von, brother of the preceding, was born at Potsdam in 1767, and studied at Berlin, at Frankfort-on-the-Oder, and at Göttingen. After traveling in France and Spain, and acting as Prussian minister at Rome, he was called to fill the office of minister of the interior in connection with ecclesiastical and educational matters, and had a most important share in the educational progress which Prussia has since made. In 1810 he became minister plenipotentiary to Vienna, took an active part in the conclusion of the Peace of Paris (1814), and at the Congress of Vienna (1815), and other great diplomatic transactions. In 1819 he was an active member of the Prussian ministry, but resigned and retired to his estate at Tegel, where he died in 1835. His works include poems, literary essays, etc., but by far the most valuable are his philological writings, such as *Additions and Corrections* to Adelung's *Mithridates; Researches Regarding the Original Inhabitants of Spain in Connection with the Basque Language;* on the *Kawi Language of Java;* on the *Diversity of Language and its Influence on the Development of Speech;* etc.

Hume (hūm), David, an eminent historian and philosopher, was born at Edinburgh in 1711. He was destined for the law, but was drawn away by his love of literature and philosophy;

David Hume.

and retired to France, where during three years of quiet and studious life he composed his *Treatise upon Human Nature*. The work was published at London in 1738, but in his own words, 'fell dead-born of the press.' His next work, *Essays, Moral, Political and Literary* (Edinburgh, 1742), met with a better reception. In 1745 he became companion to the insane Marquis of Annandale; and he accompanied General Sinclair in 1746 and 1747 in his expedition against France and in a military embassy to Vienna and Turin. He now published a recasting of his *Treatise upon Human Nature*, under the title of an *Inquiry Concerning the Human Understanding* (1747). In 1752 he published his *Political Discourses*, which were well received,

and his *Inquiry Concerning the Principles of Morals*. The same year he obtained the appointment of librarian of the Advocates' Library at Edinburgh, and began to write his history of England, of which the first volume appeared in 1754. It was, like most of the succeeding volumes, severely attacked both for its religious and political tendencies; but, in spite of adverse criticism, his *History of England*, after its completion in 1761, was recognized as a standard work. Its merits are chiefly clearness and force of narrative and philosophical breadth of view in the judgment of men and events. In 1763 he accepted an invitation from the Earl of Hertford, then proceeding as ambassador to Paris, to accompany him, and was enthusiastically received by Parisian circles in his character of philosopher and historian. After the departure of Lord Hertford in 1766, he remained as *chargé d'affaires*, and returned to England in 1766, bringing with him Rousseau, for whom he procured a pension and a retreat in Derbyshire. But the morbid sensitivity of Rousseau brought about a disagreement which put an end to the friendship. In 1767 he was appointed under-secretary of state, a post which he held till 1769, when he retired to Edinburgh. Here he lived till his death in 1776. As a philosopher, in which quality his reputation is perhaps greatest, Hume's acute sceptical intellect did great service by directing research to the precise character of the fundamental conceptions in which our knowledge and our beliefs are based. His acute negative criticism of these conceptions (*e. g.*, his reduction of the ideas of personal identity, conscience, casuality, to mere effects of association) compelled philosophy either to come to a dead halt or to find, as Kant did, a new and profounder view of the nature of human reason.

Hume, Joseph, politician and economist, born at Montrose, Scotland, in 1777. After studying medicine at Edinburgh he was appointed marine assistant-surgeon in the service of the East India Company. He held several lucrative posts, returned to England in 1808 with a fortune, and entered Parliament in 1812, where for many years he was notable as a financial reformer, and an opponent of monopolies and high taxes. He died in 1855.

Humerus (hū'mėr-us), the long cylindrical bone of the arm, situated between the shoulder and the forearm; also the corresponding bone in the lower animals.

Humidity (hū-mid'i-ti), in meteorology, the amount of moisture in the atmosphere. A given space can only contain one certain amount of water; containing less it will fill up with evaporation, if more by condensation. When it contains all the moisture it is capable of holding, it is said to be saturated. If the air contains one-half of the water necessary to saturate it the relative humidity is 50; 100 being the point of saturation, after which precipitation ensues.

Humming-birds, the name given to a family (Trochilidæ) of minute and beautiful birds, so called from the sound of their wings in flight. The beak is slender, generally long, sometimes straight and sometimes curved; the tongue is long, filiform, bifid at the point, and capable of being protruded to a considerable distance. In size humming-birds vary from that of a wren to that of a bumble-bee. They never light to take food, but feed while on the wing, hovering before a flower, supported by a rapid vibratory movement of the wings which produces the humming noise. Insects form a great proportion of their food. These beautiful birds are peculiar to America, and almost exclusively tropical. One species, the ruby-throated humming-bird (*Trochilus colubris*), is somewhat common in the northeast of the United States. The only note of the humming-bird is a single chirp, not louder than that of a cricket. It is very fearless and irascible, two males scarcely ever meeting without a contest. Among the more remarkable of these birds is the tufted-necked humming-bird (*Ornismya ornāta*) of Guiana and Northern Brazil. In this species the crest, outer tail-feathers and neck-plumes are reddish chestnut, the latter tipped with green, the throat and upper part of the breast are emerald green, the back bronze green. Perhaps four hundred species of humming-birds are now known.

Tufted-necked Humming-bird (*Ornismya ornāta*).

Humus (hū'mus), a substance which occurs in vegetable mold, and in liquids containing decomposing vegetable matter. Humus as it exists in the soil is a product of the decay of vegetables. It is a mixture of various carbon

compounds, which slowly undergo combustion with the production of carbon dioxide, water and ammonia, which are again taken up by plants.

Hundred, in England, a division of a shire or county. It was so called, according to some writers, because each hundred found 100 sureties of the king's peace, or 100 able-bodied men of war. Others think it to have been so called because originally composed of 100 families. Hundreds are said to have been first introduced into England by Alfred. Formerly if a crime was committed, such as robbery, arson, killing or maiming cattle, destroying turnpikes or works on navigable rivers, the hundred had to make it good; but hundreds are now only liable for damage done by rioters acting feloniously.

Hungary (hun'gȧ-ri; Hungarian name, *Magyar-Ország*, Land of the Magyars), a kingdom in the southeast of Austria, the Austro-Hungarian monarchy. It includes Hungary Proper, with Transylvania, Slavonia, Croatia, the Croato-Slavonian Military Frontiers, etc.; total area, 125,039 sq. miles, with a pop. of 19,254,559. Hungary Proper (including Transylvania), area, 108,258 sq. miles, and a pop. of 16,721,574, may be considered as a large basin surrounded by mountains on every side except the south. Of these the principal are the Carpathians, which cover the northern and eastern parts of the country with their ramifications. The Danube and the Theiss, with their affluents, are the chief rivers. The Poprad, in the north, is tributary to the Vistula, being the only Hungarian river not belonging to the basin of the Danube. The Drave forms the southwest frontier on the side of Croatia and Slavonia. Between the Danube and the Drave lie the two principal lakes, the Platten See or Balaton Lake and the Neusiedler See, from which the water occasionally disappears. Hungary is one of the healthiest countries in Europe, and generally has a fertile soil. All kinds of grain, especially excellent wheat, wines, fruits, tobacco, hemp, flax, hops, saffron, woad, madder, sumach and cotton, are among the products of Hungary. Horses, cattle, sheep, hogs, game (in the north bears), poultry, fish, (especially the sturgeon and salmon), bees and silkworms are among the productions of the animal kingdom. Among the minerals are gold, silver, copper, iron, lead, zinc, cobalt, antimony, sulphur, arsenic, salt, etc., with coal and peat. The situation of Hungary, which occupies an area where the various races of Europe meet and interlace, accounts for the variety of nationalities it contains. These comprise, besides the Hungarians or Magyars (over 6,000,000 in number), Roumanians, Slovacks, Germans, Servians, Ruthenians, etc. The Magyars, who are the dominant race, are located for the most part compactly in the center of the kingdom. They are brave, high-spirited and sincere, in many respects resembling their kinsmen the Turks. A decided majority are Roman Catholics, the rest Protestants, chiefly Calvinists, with a few Greek Catholics. The Germans have settled all over the country, and there is scarcely a town of Hungary which is not at least partly inhabited by Germans, while some are essentially German. Science, literature, the press, trade and industry, are for the greater part in their hands. The Hungarian has a natural inclination to agriculture and the breeding of cattle, and the fertility of the soil making up for some deficiencies in methods has made Hungary one of the chief grain-growing countries of Europe. The Hungarian flour is of very fine quality, and is exported to a large value, while there are also extensive wheat exports. Hungary is also celebrated for its wines, the finest variety of which is the Tokay. There are few extensive manufactures. Iron and steel works, potteries, glass manufactories, sugar-refineries, soap and tallow works, are among the principal. The production of coal and iron is increasing and the annual value of the mining products is about $20,000,000. With regard to popular education Hungary is behind the Austrian part of the empire, but education was made compulsory in 1868. There are universities at Budapest, Klausenburg and Agram. The Hungarian language is nearly allied to the Turkish and Finnish, but not to any other tongue spoken in Europe. It has of late been carefully cultivated, and Hungarians have distinguished themselves in all branches of literature. Among modern names we can only mention those of Andrew Horváth, Eötvös, A. and C. Kisfaludy, Garay, Vörösmarty, Petöfi, Kerény, Arany, Josika and Jokay. Besides its representation in the controlling body of Delegations (see *Austria*) Hungary since 1867 has had an independent Diet, consisting of an Upper and Lower House, the first composed of hereditary and life peers, church dignitaries and state dignitaries; the second of representatives elected by vote. The Austrian emperor is only king of Hungary. Croatia and Slavonia have a common diet of their own for the management of internal affairs.

History.—The Magyars, an Asiatic peo-

ple of Turanian race, allied to the Finns and the Turks, dwelt in what is now Southern Russia before they descended under Arpád into the plain of the Danube, towards the end of the ninth century, and conquered the whole of Hungary and Transylvania. During the first half of the tenth century their invasions and incursions spread terror throughout Germany, France and Italy, but at length their total defeat by Otho I of Germany put an end to their maraudings, and under their native dynasty of Arpáds they settled down to learn agriculture and the arts of peace. Stephen I (907-1030) was the first who was successful in extending Christianity generally amongst the Hungarians, and was rewarded by a crown from Pope Sylvester II and with the title of *apostolic king* (1000). Stephen encouraged learning and literature, and under him Latin became not only the official language of the government, but the vehicle of Hungarian civilization, which it unfortunately continued to be for the next 800 years. In 1089 King Ladislaus extended the boundaries of Hungary by the conquest of Croatia and Slavonia, and King Coloman by that of Dalmatia in 1102. During the twelfth century the Hungarians first attained, through French connections, a certain refinement of life and manners. About the middle of the thirteenth century King Bela induced many Germans to settle in the country which had been depopulated by the Mongol invasions. With Andrew III (1290-1301) the male line of the Arpád dynasty became extinct, and the royal dignity now became purely elective. Charles Robert of Anjou was the first elected (1309). Louis I (1342-82) added Poland, Red Russia, Moldavia and a part of Servia, to his kingdom. The reign of Sigismund (1387-1437), who was elected Emperor of Germany, is interesting from the invasion of Hungary by the Turks (1391), and the war with the Hussites. Sigismund introduced various reforms, and founded an academy at Buda. Matthias Corvinus (1458-90), combining the talents of a diplomatist and general, was equally successful against his enemies at home and abroad, and is even yet remembered by the popular mind as the ideal of a just and firm ruler. He founded a university at Pressburg. During the reigns of Ladislaus II (1490-1516) and Louis II (1516-26) the rapacity of the magnates and domestic troubles brought the power of Hungary low, and the battle of Mohacs (1526) made a great part of the country a Turkish province for 160 years. The rest was left in dispute between Ferdinand of Austria and John Zapolya; but eventually by the help of the Protestants it passed to the former, and has since remained under the scepter of the Hapsburgs. In 1686 Leopold I took Buda and recovered most of Hungary and Transylvania. In 1724 Charles VI secured by the Pragmatic Sanction the Hungarian crown to the female descendants of the house of Hapsburg, and the loyalty of the Hungarians to his daughter, Maria Theresa, saved the dynasty from ruin. Maria Theresa did much for the improvement of Hungary by the promulgation of the rural code called Urbarium, and by the formation of village schools. On the advent of the French revolution, and during the wars which ensued, the Hungarians once more played a prominent part in support of the Hapsburg crown. Napoleon fell, but the revolution had given an impetus to ideas of national and popular rights which the Hungarians, long stifled under the Germanic traditions and tendencies of their rulers, were amongst the first to feel. For a time Francis I and Metternich stood stiffly out against all concessions, and tried to govern by pure absolutism, but ended by summoning in 1825 a new diet. The diet distinguished itself by adopting the Magyar language in its debates, instead of the Latin to which it had been accustomed. Succeeding diets in 1830 and 1832 made new demands in the direction of religious equality, a popular suffrage, and abrogation of the privileges of the nobles. The Austrian government attempted to repress the Hungarian national movement by imprisoning Deák, Kossuth, and others of the leaders. The struggle continued till 1848, when the French revolution of that year gave the impulse for a similar rising in Vienna. Prince Metternich fled to London, and the Viennese court made a formal concession of all important demands but these had no sooner been granted than the government began secretly to work against their being put in operation. The dependencies of the Hungarian crown, the Croats and the Wallachians of Transylvania were privately encouraged to revolt, and in December of the same year an Austrian army took the field with the avowed object of annihilating the independence of Hungary; but a series of pitched battles resulted on the whole so much in favor of the Hungarians that Austria was obliged to call in the aid of Russia, which was at once granted. After a heroic struggle the Hungarians had to succumb. The nation was reduced to the position of a province, and some of the greatest statesmen and soldiers of Hun-

gary perished on the scaffold. But the struggle was continued by the Hungarians in the form of a constitutional agitation, and at last, when the battle of Sadowa in 1866 separated Austria from Germany, Austria, left face to face with a nation almost as powerful and numerous as itself, felt compelled to submit. In 1867 a separate constitution and administration for Hungary was decreed, and on June 8th the emperor and empress were crowned king and queen of Hungary with the utmost pomp, according to the ancient ceremonies of a Hungarian coronation. The dualism of the Austrian empire was thus finally constituted. It was indeed but the partial recognition of the fact that the empire was a heterogeneous assemblage of communities differing widely in race, language, social habits and customs, and bound together only by the accident of having fallen to the house of Hapsburg. The Hungarians have continued to show dissatisfaction with the Austrian rule and have demanded and gained several important concessions. The demand for universal suffrage was granted in 1907, and the efforts to introduce the German language in the Hungarian regiments was vigorously resisted. In 1908 separate, but identical, tariffs for both countries were granted, and a demand has developed for economic independence, the establishment of a customs barrier between the nations. A Court of Arbitration for the settlement of disputes has been organized.

Hungary Balsam, a kind of turpentine procured from *Pinus Pumilio*, the mountain-pine of Hungary.

Hungary Water, a distilled water consisting of dilute alcohol aromatized with the tops of flowers of rosemary or other aromatic substances, used as a perfume, so called because first made for the use of a queen of Hungary.

Hunger (hun'gėr), a craving for food. It is a sensation partly arising in the stomach, since it may be relieved temporarily by the introduction into the stomach of material which is incapable of yielding any nutriment to the body. It may be due to a condition of fullness of the vessels of the stomach, relieved by any stimulus which, acting on the lining membrane, induces a flow of fluid from the glands. But it also arises from a condition of the system, since the introduction of nutriment into the blood, apart altogether from the stomach, will relieve it. This is also evident from the fact that hunger may be experienced even when the stomach is full of food, and when food is supplied in abundance, if some disease prevents the absorption of the nourishment, or quickly drains it from the blood. Hunger may be partially allayed by sleep or by the use of narcotics, tobacco and alcohol, all of which tend to diminish the disintegration of tissues.

Hüningen (hų'ning-en), a town of Germany, in Upper Alsace, formerly fortified. It has a famous imperial fish-breeding establishment. Pop. 3304.

Huns, a nomadic and warlike people of Asia, of Mongolian race, part of whom entered Europe, probably in the fourth century after Christ, conquered the Alans, and drove the Goths out of Dacia. They continued to extend their dominion along the Danube till the time of Attila (434 A.D.), who, uniting the whole Hunnish power under one head became the most powerful prince of his time. (See *Attila.*) His defeat near Chalons was the commencement of the decline of the power of the Huns, and within a generation after his death in 453, the great Hunnish empire had completely disappeared, and the race been absorbed amongst other barbarous peoples. The term Huns was used by ancient and mediæval writers in a very vague way to indicate barbarous hordes invading Europe from the northeast. The Huns are described as a race of dark complexion with small black eyes, flat noses and broad shoulders.

Hunt, James Henry Leigh, an English poet and essayist, born at Southgate, near London, in 1784. He was educated at Christchurch Hospital, where he attained some distinction, entered the office of his brother, an attorney, and afterwards obtained a situation in the war office. In 1808, in conjunction with his brother John, he started the *Examiner* newspaper, which soon became prominent for the fearlessness with which public matters were discussed. Ere long official resentment took shape in two prosecutions of the brothers, the second of which, occasioned by an article in the paper of March 22, 1812, reflecting on the character of the prince regent, resulted in the brothers being sentenced to pay a fine of £500 each, and to suffer two years' imprisonment. During his confinement Leigh wrote several works, among which are the *Feast of the Poets*, the *Descent of Liberty* and the *Story of Rimini.* In 1818 appeared *Foliage*, a collection of original poems and translations from Homer, Theocritus, Bion, etc., and in 1819 the *Indicator* was started. a weekly journal on the model

of the *Spectator*, which contained some of his best essays. In 1822 he proceeded to Italy, having received an invitation thither from Byron and Shelley, and, in conjunction with the former, carried on a newspaper called the *Liberal*, but it proved unsuccessful. On his return to England Hunt published *Recollections of Lord Byron and some of his Contemporaries* (two vols., 1828), which provoked somewhat the indignation of the noble poet's friends. Among his subsequent works may be mentioned, *A Legend of Florence*, a play represented with some success at Covent Garden in 1840; *Stories from the Italian Poets* (two vols., 1846); *Men, Women and Books* (1847); *A Jar of Honey from Mount Hybla* (1847); *The Town, its Memorable Characters and Events* (1848); *Autobiography* (three vols., 1850); *Table Talk* (1850). In 1842 Mrs. Shelley settled an annuity of £120 upon Leigh Hunt, and in 1847 a government pension of £200 a year was bestowed on him. He died in 1859.

Hunt, Thomas Sterry, chemist, born at Norwich, Connecticut, in 1826; died in 1892. He was professor of chemistry at McGill University, 1862-68, and of geology at the Massachusetts Institute of Technology, 1872-78. He contributed many valuable papers to scientific journals, developed an original system in organic chemistry and made important researches into the composition of rocks. In 1859 he invented the green ink with which greenbacks are printed.

Hunt, William Holman, an English painter, born in 1827 at London. He was trained in the Royal Academy school, and began to exhibit in 1846. He belongs to the so-called Pre-Raphaelite school of English artists. (See *Pre-Raphaelite School.*) In 1853 his *Claudio and Isabella* first attracted public attention, followed next year by the *Light of the World* (Christ teaching in the temple). Mr. Hunt then made a journey to the East, the fruits of which are observable in the local coloring and strength of realization in his succeeding pictures of Eastern life, among which we may mention *The Seapegoat* (1856); *The Finding of the Saviour in the Temple* (1860); *Shadow of the Cross* (1873); *Plains of Esdraelon* (1877); *Triumph of the Innocents* (1885). Outside of Biblical subjects Mr. Hunt painted some notable pictures: *Isabella and the Pot of Basil, The After-Glow, The Festival of St. Swithin*, etc. He died in 1910.

Hunter, John, surgeon and physiologist, was born at Long Calderwood, Lanarkshire, in 1728. He assisted his brother-in-law, a carpenter in Glasgow, for some time in his trade, but afterwards went as assistant to his brother William, a prosperous surgeon in London. In 1756 he was appointed house-surgeon at St. George's Hospital, and also lectured in his brother's school of anatomy. In 1760, his health needing a change of climate, he became staff-surgeon

William Holman Hunt.

and went with the army to Portugal. Three years afterwards he returned to London, and, in 1768, was appointed surgeon to St. George's Hospital; in 1790 surgeon-general to the army, and inspector-general of hospitals. He died in 1793. Hunter contributed greatly to the high development of English surgery, as well as to the advance of anatomy and physiology. One of his chief works was on the *Blood, Inflammation and Gunshot Wounds* (1794). His valuable museum of surgical and anatomical subjects was purchased by the government and presented to the Royal College of Surgeons.

Hunter, William, physician and anatomist, elder brother of the preceding, was born at Long Calderwood, Lanarkshire, in 1718; studied at Glasgow with a view to entering the church, but abandoned theology for medicine. In 1741 he went to London, where he became a member of the College of Surgeons; acquired a large practice in surgery and midwifery; was appointed accoucheur to the British Lying-in Hospital, and in 1764 physician-extraordinary to the queen; in 1767 a fellow of the Royal Society; in 1780 foreign associate of the Royal Medical Society at Paris, etc. In 1770 he established a theater of anatomy for his own lectures and a splendid museum for his anatomical preparations, objects of natural history, pictures

of ancient coins and medals, etc. He was the author of some important works, in particular the *Anatomy of the Human Gravid Uterus*, published in 1774. He died in 1783, bequeathing the whole of his splendid museum, valued at £150,000, to the University of Glasgow, with the sum of £8000 in cash to be expended in a building for its reception, and a further sum of £500 per annum to bear the charges of its preservation.

Hunting. See *Fox-hunting.*

Huntingdon (hunt'ing-dun), HUNTINGDONSHIRE, (contracted to HUNTS), a small inland county of England, 30 miles long by 23 broad; area, 359 sq. miles. It has no hill-ranges of importance, and almost the whole area is arable or in pasture. It is watered chiefly by the Ouse and the Never, which form its northern boundary. The soil has been much improved by scientific farming. The northeastern part is included in the great fen district and is principally devoted to grazing. There were here formerly some large lakes or meres, but they have been drained and made available for cultivation. The soil is principally clay, with sand, gravel and peat-earth in places, the latter in the fen district. There are here many relics of the ancient Roman occupation and two Roman roads traverse the county. There are also interesting mediæval ruins and buildings of historic interest. Pop. 57,583.

Huntingdon, a borough, capital of Huntingdonshire, England, on the N. bank of the Ouse, 17 miles N. W. of Cambridge. It has ancient churches and various manufactures, and was the birthplace of Oliver Cromwell. Pop. 4003.

Huntingdon, a borough, capital of Huntingdon county, Pennsylvania, on the Juniata River, 34 miles E. of Altoona, in the south-center of the State. It is the seat of Juniata College and a State industrial reformatory, and has manufactures of importance, including boilers and radiators, sewer-pipe, knit goods, tanneries, etc. Pop. 6861.

Huntingdon, SELMA, COUNTESS OF, an English lady, eminent for piety and munificence, daughter of the Earl of Ferrers, was born in 1707, and died in 1791. She was married in 1728 to the Earl of Huntingdon. After his death she joined the Calvinistic Methodists, chose Whitefield for her pastor, and was noted for zeal and devotion. She formed a sect known as the 'Countess of Huntingdon's connection.'

Huntington, a city, capital of Huntington county, Indiana, on the Little River, one mile from the Wabash, and 24 miles S. W. of Fort Wayne. It has large water power and extensive limestone quarries, and produces lime, wooden-ware, bicycles, pianos, boots and shoes, etc. Pop. 10,272.

Huntington, a city, capital of Cabell county, West Virginia, on the Ohio River, 18 miles above Ironton, Ohio, and on the Baltimore and Ohio and Chesapeake and Ohio Railroads. Here is Marshall College and a State asylum for incurables. Its manufactures comprise cars and car-wheels, lumber, glass, stoves, cigars, etc. Coal, iron, salt and lumber are shipped. Pop. 31,161.

Huntington, a town in Fairfield county, Connecticut, 13 miles W. of New Haven. It has saw-mills, distilleries, and various manufactures. Pop. 6545.

Huntington, DANIEL, artist, was born in New York city in 1816. He became in 1835 a student of Professor Morse, and in 1839 visited Italy, where he painted *Sibyl* and *Shepherd Boy of the Campagna.* After his return to New York he devoted himself to portraits, but executed also a great number of genre and historical pieces. In 1862-69 he was president of the National Academy, and again in 1877-91. Among his later works are *Philosophy and Christian Art* (1878), and *Goldsmith's Daughter* (1884). Among his portraits are those of President Lincoln and Senator John Sherman. He died in 1906.

Huntley, a town of Scotland in Aberdeenshire, 41 m. N. W. of Aberdeen. Pop. 4136.

Huntsville, a town, capital of Madison county, Alabama, 98 miles W. S. W. of Chattanooga. It is an important educational center, and is surrounded by magnificent scenery. It has cotton-seed oil works, machine shops, a cotton factory, etc. Pop. 7611.

Hunyady Janos (hun'ya-di), a famous Hungarian soldier, born in Hunyad, Transylvania, in 1387; died in 1456. His life was devoted to an almost unceasing contest with the Turks, in which he showed striking military ability. His most celebrated exploits were the expulsion of the Turks from Transylvania in 1442, the brilliant campaign south of the Danube in 1443, and the storming of Belgrade in 1456. He was defeated at the battles of Varna and Kossova. He acted as governor of the kingdom, 1445-53, and one of his sons succeeded to the crown of Hungary.

Hura (hū'ra), a genus of tropical American plants, nat. order Euphorbiaceæ. *H. crepitans*, the sand-box tree, is remarkable for the loud report with which its seed-vessels burst. It is a large, branching tree with glossy, poplar-like leaves, inconspicuous diœcious flowers, and large, furrowed, roundish fruits of the size of an orange.

Sand-box Tree (*Hura crepitans*).

Hurdles (hur'dlz), frames formed of perpendicular stakes with horizontal bars, and braced with diagonal pieces for the purpose of forming temporary fences. In fortification the name is given to a collection of twigs or sticks closely interwoven and sustained by long stakes, serving to render works firm, or to cover traverses and lodgments for the defense of workmen against firearms or stones.

Hurdwar. See *Hardwar.*

Hurdy-gurdy (hur'di - gur'di), a stringed instrument, played by turning a handle. Its tones are produced by the friction of a wheel acting the part of a bow against four strings, two of which are pressed by the fingers or by keys. The other two strings are tuned a fifth apart to produce a drone bass, and are not stopped by the fingers or keys.

Hurdy-gurdy.

Huron, a city, the capital of Beadle county, South Dakota, 119 miles E. by N. of Pierre. It has a large shipping and supply business and various manufactures. Pop. 5791.

Huron (hū'run), Lake, one of the five great lakes on the frontiers of the United States and Canada. It is the third in size, being 218 miles long north and south, and (including Georgian Bay) 180 miles broad at its widest part, with an area of about 21,000 sq. miles. It lies 578 feet above sea-level. The lake contains several thousand islands, varying in size from a few square feet to huge islands like the Great Manitoulin, which is about 107 miles long and from 4 to 25 miles wide, and is the only one inhabited. The waters are very clear and pure, abound in fish, and have a depth averaging from 800 to 1000 feet.

Huronian Rocks, in geology, a term applied to certain rocks on the banks of Lake Huron, consisting of quartzite, with masses of chloritic schist. They occupy the same relative position as the upper parts of the Archæan rocks of Britain.

Hurons. See *Wyandots.*

Hus (hös), John. See *Huss.*

Hushiarpur. See *Hoshiarpur.*

Huskisson (hus'kis-un), William, an English statesman, born in Worcestershire, in 1770. In 1790 he was appointed secretary to Lord Gower, the British ambassador at Paris, and in 1795 became under-secretary for war and the colonies. In 1796 he became member of Parliament for Morpeth, and in 1804 secretary of the treasury in the

William Huskisson.

Pitt administration. In 1814 he was appointed chief commissioner of woods and forests; he was returned for Liverpool in 1823, and made president of the board of trade. In 1827 he became Secretary of State for the colonies, under Lord Goderich. He had now come to be a recognized

authority on all questions of trade and commerce. In 1828 a misunderstanding with the Duke of Wellington, then at the head of the cabinet, led to his withdrawing, along with other Tories, from the administration. He was accidentally killed at the opening of the Liverpool and Manchester Railway, September 15, 1830.

Huso (*Acipenser huso*), the great or white sturgeon. See *Sturgeon.*

Huss, or Hus, John, a Bohemian religious innovator, born about 1373. He studied at the University of Prague, took the degree of Master of Arts in 1396, and in 1398 began to lecture on theology and philosophy. In 1401 he was made dean of the faculty of philosophy, became the leader of the Bohemian in opposition to the German professors and academicians, and after the withdrawal of the latter to Leipzig, was made rector of the university (1409). Since 1391 he had been acquainted with the writings of Wickliffe, and his denunciation of the papal indulgences, of masses for the dead, of auricular confession, etc., alarmed Archbishop Sbynko of Prague, who had 200 volumes of Wickliffe's writings burned (1410) in the archiepiscopal palace, and the preaching in Bohemian prohibited. Huss appealed to the pope, John XXIII, who summoned him to appear at Rome. Huss refused to appear, and was in consequence excommunicated, and Prague laid under an interdict as long as Huss should remain in it. The people of Prague, however, stood by their preacher, and the pope was compelled to acquiesce. But the quarrel broke out again when Huss and his friend Jerome publicly condemned the papal indulgences granted for the crusade against Ladislaus of Naples. Huss was again excommunicated and Prague interdicted. The reformer now retired to Hussinatz to the protection of his feudal lord, and here he wrote his books *On the Six Errors* and *On the Church*, in which he attacks transubstantiation, the belief in the pope and the saints, the efficacy of the absolution of a vicious priest, unconditional obedience to earthly rulers, and simony, which was then extremely prevalent, and makes the Scriptures the only rule of matters of religion. The approbation with which these doctrines were received, both among the nobility and common people, increased the party of Huss in a great degree, and emboldened him to comply with the summons of the Council of Constance to defend his opinions before it. The Emperor Sigismund, by letters of safe conduct, became responsible for his personal safety; and John XXIII, after his arrival at Constance, November 4, made promises to the same effect. Notwithstanding this, he was thrown into prison, November 28, and after several public examinations, conducted with a view to making him retract opinions deemed heretical, he was sentenced to death on July 6, 1415, and burned alive the same day, and his ashes thrown into the Rhine. See also *Hussites.*

Hussars (hö-zârz′), originally the name of the Hungarian cavalry, raised by Matthias I in 1458. Every twenty houses were obliged to furnish a man, and thus from the Hungarian word *husz* (twenty) was formed the name *Huszar*, *Hussar*, afterwards applied generally to light cavalry, similarly dressed and armed, of other European armies.

Hussites (hus′īts), the followers of John Huss. After the death of Huss, his adherents took up arms for the defense of their principles, and under the leadership of Johann Ziska, captured Prague, fortified Mount Tabor, and repeatedly defeated the troops sent against them by the Emperor Sigismund, who had succeeded to the crown of Bohemia. Ziska died in 1424, and was succeeded by Procopius, who also distinguished himself by many victories. The excesses of this party, however, who were called the *Taborites*, alienated the moderate Hussites, who called themselves *Calixtines*, and who finally united with the Catholics by the Compact of Prague in 1433 to acknowledge Sigismund as king; certain concessions, especially the use of the cup for the laity, having been made to them by the Council of Basel. The Taborites, thus weakened, were totally defeated at Bömischbrod on 31st May, 1434, and afterwards declined as a political party, finally becoming merged in the Bohemian Brethren. See *Bohemia*, *Bohemian Brethren.*

Hustings (hus′tingz), (1) a name given to a court formerly held in many cities of England, as York, Winchester, Lincoln, but especially applied to the county court of the city of London held before the lord-mayor, recorder and sheriffs. (2) The platform from which candidates for seats in Parliament addressed the constituency on their nomination previous to the Ballot Act of 1872.

Husum (hö′zum), a seaport of Prussia in Schleswig-Holstein, with a good trade. Pop. 8268.

Hutcheson (huch′e-sun), Francis, philosophical writer, born in Ireland in 1694. He studied at the University of Glasgow from 1710 to 1716, was licensed to preach, but set

up a private academy in Dublin. In 1725 his celebrated *Inquiry into the Ideas of Beauty and Virtue* appeared, followed in 1728 by his *Treatise on the Passions*. In 1729 he was called to the chair of moral philosophy at Glasgow. The main features of his philosophical teachings are the theory of a distinct moral sense or conscience peculiar to man, and his view of virtue as benevolence. Hutcheson's moral philosophy is strongly opposed to the empiricism of Locke, and in this respect he may be considered as the precursor of Reid and the Scottish school of philosophy. In 1755 a *System of Moral Philosophy* was published from his MSS.

Hutchinson (huch'in-sun), JOHN, an English officer of the Parliament and governor of Nottingham Castle during the great civil war, was born at Nottingham in 1616, studied at Cambridge, and afterwards went to London to study law. In 1638 he married Lucy, the daughter of Sir Allan Apsley. On the outbreak of the civil war he joined the popular party, and was appointed governor of Nottingham Castle, which he defended against the royalists with great skill and gallantry. On the termination of the war he was returned to Parliament for his native town, and was a member of the high court of justiciary which condemned the king to death, but subsequently retired from public life, because he disapproved of Cromwell's arbitrary conduct as a ruler. After the Restoration Colonel Hutchinson was arrested and died in prison in 1664.

Hutchinson, a city, capital of Reno county, Kansas, on the Arkansas River, 45 miles N. W. of Wichita. It is traversed by several railroads; has a State reformatory and manufactures salt extensively, there being large deposits of rock salt here. It has also flour mills and large pork-packing establishments. Pop. 16,364.

Hutten (fon hö'ten), ULRICH VON, a German knight, distinguished for the influence which his writings exercised upon the Reformation, was born at the family castle of Steckelberg on the Main, in 1488, and educated at the famous monastic school of Fulda. He led a wandering and unsettled life, sometimes appearing as the man of letters and controversialist, at other times as the soldier. His first attacks on the Roman Church were in connection with his defence of the persecuted Reuchlin, and with the issuing of the *Epistolæ Obseurorum Virorum* (which see). In 1517 he was crowned laureate at Augsburg, and knighted by the emperor. A year or two after he retired to his fraternal castle to write work after work, addressing the people, like Luther, in their native German, and denouncing the arrogance and corruption of Rome. The Roman authorities at length began to move against him, and he fled to the castle of his friend Franz von Sickingen, and from that again to Switzerland, where he died in 1523.

Hutton (hut'ton), CHARLES, an English mathematician, born at Newcastle-upon-Tyne, in 1737. He was first a teacher of mathematics at Newcastle, but having published in 1772 a small work on the *Principles of Bridges*, which attracted attention, he was next year appointed professor of mathematics at Woolwich College. In 1785 he published his *Mathematical Tables*, followed not long after by his *Tracts, Mathematical and Philosophical* and *Elements of Conic Sections*. His *Mathematical and Philosophical Dictionary* appeared in 1795-96; his *Course of Mathematics* in 1798, with an additional volume in 1811. In 1812 he published another collection of *Tracts* on mathematical and philosophical subjects. He died in 1823.

Hutton, JAMES, a Scottish geologist, born at Edinburgh in 1726. He studied at the university there and at Leyden, where he was graduated as M.D. in 1749. Returning to Scotland, he settled for a time on a farm of his own in Berwickshire, but about 1768 went to Edinburgh, and devoted himself to scientific researches. His name is especially connected with a geological system, the chief features of which are his recognition of the similarity of processes in the past and present, and his theory of igneous fusion as accounting for most geological phenomena. Among his numerous works are an *Investigation of the Principles of Knowledge*, a *Theory of Rain* and a *Theory of the Earth, with Proofs and Illustrations* (1795). He died in 1797.

Huxley (hukz'li), THOMAS HENRY, an English naturalist, born at Ealing, Middlesex, in 1825. He was graduated M.B. at the University of London in 1845, and entered the royal navy as assistant surgeon in 1846. Sailing in the *Rattlesnake* on a surveying expedition to Australia, he sent a number of valuable papers to the Royal Society. He held numerous educational and other positions, was president of the British Association in 1870, was elected lord-rector of Aberdeen University in 1872, was secretary of the Royal Society, and a member of various royal commissions, etc., resigning nearly all his positions in 1885 on account of ill health. He was made a member of the privy council in 1892. Among his

works are *The Oceanic Hydrozoa* (1857), *On the Theory of the Vertebrate Skull, Man's Place in Nature* (1863). *Elements of Comparative Anatomy* (1864), *Elementary Physiology* (1866), *Lay Sermons, Addresses and Reviews*, (1870), *Physiography* (1877), *Anatomy of In-*

Thomas Henry Huxley.

vertebrate Animals (1877), *The Crayfish* (1879), *Science and Culture* (1882). He was a very popular lecturer, and stood in the foremost rank among biologists, strongly sustaining the Darwinian theory. He died in 1895.

Huy (wē), a town of Belgium, province of and 18 miles southwest of Liége. It has a strongly-fortified citadel. Pop. 14,164.

Huygens (hoi'gens), CHRISTIAN, a Dutch mathematician and physicist, born in 1629. He studied at Leyden and at Breda, where he went through a course of civil law from 1646-48. He made several journeys to Denmark, France and England; in 1666 settled at the invitation of Colbert in Paris, where he remained till 1681, when he returned to Holland on account of his health. He died at The Hague in 1695. Among his most important contributions to science are his investigations on the oscillations of the pendulum, and his *System of Saturn*, in which he first proved that the ring completely surrounds the planet, and determined the inclination of its plane to that of the ecliptic. In 1690 he published important treatises on light and on weight. His *Traité de la Lumière* was founded on the undulation theory, but in consequence of the prevalence of the Newtonian theory it was long neglected till later researches established its credit.

Huysum (hoi'sụm), JAN VAN, a distinguished Dutch flower and fruit painter, born at Amsterdam in 1682. He worked at first with his father Justus Huysum, a picture dealer and painter, but afterwards set up on his own account, devoting himself to the painting of fruit and flowers, in which he reached the highest perfection, surpassing all his predecessors in softness and delicacy of color, fineness of penciling and exquisite finish. He was extremely jealous of rivalry, and kept his methods of working, preparation of colors, etc., a deep secret. He died at Amsterdam in 1749. His brother JUSTUS was a battle painter, and died at the age of twenty-two years. Another brother, JAKOB, copied his brother's flower and fruit pieces so perfectly that they have been mistaken for that master's work. He died in England in 1740.

Hwang-Ho. See *Hoang-Ho.*

Hyacinth (hī'a-sinth), a genus of liliaceous bulbous plants, including about thirty species, among which the garden hyacinth (*Hyacinthus orientālis*) is celebrated for the immense varieties which culture has produced from it. It is a native of the Levant, and was first cultivated as a garden flower by the Dutch about the beginning of the sixteenth century.

Hyacinth, or JACINTH, a variety of the mineral zircon, whose crystals, when distinct, have the form of a four-sided prism, terminated by four rhombic planes, which stand on the lateral edges. Its prevailing color is red, more or less tinged with yellow or brown. The name hyacinth is also given to varieties of the garnet or cinnamon stone, the sapphire, and topaz.

Hyades (hī'a-dēz), a cluster of five stars in the constellation Taurus, supposed by the ancients to indicate the approach of rainy weather when they rose with the sun.

Hyæna. See *Hyena.*

Hya-hya (*Tabernæmontanautilis*), a milky plant of South America. See *Cow-trees.*

Hyalite (hī'a-līt), a pellucid variety of opal, resembling colorless gum or resin.

Hyatt (hī'at), ALPHEUS, scientist, born at Washington, D. C., in 1838; died in 1902. He served with distinction in the civil war, held professorships in leading scientific institutions, and in 1881 became professor of zoölogy and palæontology in the Massachusetts Institue of Technology. He was subse-

quently curator of the Boston Society of Natural History. He wrote *Memoirs on the Polyzoa, Guides for Science Teaching*, etc.

Hyatt, John Wesley, inventor, was born at Starkey, New York, in 1837. His inventions were chiefly that of celluloid, which became an enormous industry, a solvent for pyroxylin, and a water purifying system.

Hybla (hī'bla), a mountain in Sicily, where thyme and odoriferous flowers of all sorts grow in abundance. It was famous in ancient times for its honey.

Hybrid (hī'brid), the produce of a female animal or plant which has been impregnated by a male of a different allied species or genus. Much uncertainty prevails respecting the productive crossing of species, but it seems to be established that while the crossing of different genera may result in offspring, that of different orders will not. Hybrids are obtained among fishes from different species of carp; among birds, from the goldfinch and canary, the swan and the goose, etc.; among mammals, from the horse and the zebra, the horse and the ass, the produce of the last two being the mule proper; from the lion and tiger, the dog and wolf, the dog and fox, the goat and ibex. Instances of hybrids between animals of different genera have been furnished by the union of the goat and the antelope, and of the stag and the cow. It used formerly to be considered that the propagative power of hybrids was either absolutely null, or that they propagated only with an individual of the pure breed; but the experiments of Dr. Darwin and other recent researches have shown that although infertility to some degree generally attends sexual intercourse between different species, yet in such intercourse every degree of difference from absolute sterility up to complete fertility is found. The results hitherto obtained may be summarized as follows:—The crossing of species of different families is in almost every case infertile; allied species are capable of producing offspring, and this capability is in indefinite ratio to the degree of their likeness; hybrids are frequently fertile with their parents, but more rarely among themselves; there is no fixed relation between the degree of fertility manifested by the parent species when crossed and that which is manifested by their hybrid progeny. In many cases two pure species can be crossed with unusual facility, while the resulting hybrids are remarkably sterile; and, on the other hand, there are species which can only be crossed with extreme difficulty, though the hybrids when produced are very fertile.

Hycsos (hik'sōs), or Hyksuos, or Shepherd Kings, wandering tribes of Semitic descent, who conquered the whole of Egypt about 2100 B.C., and were driven out some five hundred years afterwards. The only detailed account of them in any ancient writer is a passage of a lost work of Manetho, cited by Josephus. Their epoch covers the thirteenth to the seventeenth dynasties.

Hydaspes (hī'dus-pēz), ancient name of a river of India, the modern Jehlam, or Jhilam.

Hydatid (hī'da-tid), a term applied to a kind of bladder-worm, which is the larval stage of a small tapeworm, the *Tænia echinococcus*, found in the dog and wolf. The hydatid consists of an external sac, which is derived from the tissue of the organ in which it is situated, and which is filled with buds or capsules containing the larvæ of the worm.

Hyde (hīd), a town of England, in Cheshire, about 7 miles E. S. E. of Manchester. The inhabitants are largely employed in cotton manufacture and coal mines. There are also iron foundries and engineering works. Pop. 32,766.

Hyde, or Hide, measure of land, frequently mentioned in Domesday-book and in old English charters, and variously estimated as equivalent to 60, 80, and 100 acres—a fact which may be accounted for on the supposition that the quantity was always determined by local usage. It was such a portion of land as might be ploughed with one plough. The hyde at present is reckoned at 100 acres.

Hyde Park, a town of Norfolk county, Massachusetts, 8 miles S. by W. of Boston. It is the seat of Blue Hill Observatory, has various manufactures and is a place of residence for Boston business men. Pop. 15,507.

Hyde Park, a London park containing about 400 acres, and having on the west Kensington Gardens. It abounds with fine trees, and is the great fashionable promenade and public lounge of Western London. It contains the Rotten Row, a piece of road set apart for equestrians; the Serpentine, a large sheet of ornamental water, much frequented in summer for bathing, and during frosts for skating; and the Albert Memorial, a structure in memory of the Prince Consort.

Hyderabad, or Haidarabad (hī-dar-ä-bâd'), a state of Hin-

dustan, which comprehends the greater part of that central plateau of Southern India known as the Deccan, and is in possession of a Mohammedan prince, the Nizam; area 82,700 sq. miles, exclusive of the Berar or Hyderabad Assigned Districts under British administration. The country is intersected or bounded by the Godavery, Kistnah, and their tributaries. The soil is fertile, though much good land is not yet brought under cultivation. The chief products are rice, wheat, maize, sugar-cane, tobacco, cotton, indigo, fruits and timber. Pop. 11,174,897. The ruler of Hyderabad belongs to a dynasty founded by Asaf Jah, a distinguished soldier, whom the Emperor Aurungzebe made viceroy of the Deccan in 1713, with the title of Nizam or Regulator. Mir Mahbub Ali, the present Nizam, was born in 1866, and is in point of rank the first Mohammedan ruler in India, with a regular army of about 15,000, besides numerous irregulars.—HYDERABAD, the capital, is situated on the River Musi, at an elevation of 1672 feet above the sea. It is surrounded by a stone wall flanked with bastions, forming an irregular quadrangle about 2¾ miles upon the river and 2 miles broad. Among the chief buildings are the extensive palace of the Nizam, the British residency, the Char Minar, or Four Minarets, built about 1590 as a Mohammedan college, but now used for warehouses; the Jama Masjid, or cathedral mosque, designed after the one at Mecca. There are manufactures of silks, trinkets, and turbans. Pop. of city, with suburbs, is given as 448,466.

Hyderabad, or HAIDARABAD, a town of Hindustan, capital of Hyderabad District, Sind. It is situated on a rocky eminence about 3 miles from the eastern bank of the Indus. The streets are narrow and dirty, and the houses mere hovels. The fort contains the arsenal of the province of Sind and the palace of the Emirs. The principal manufactures are arms, silks, cottons, and lacquered ware. Pop. 69,378.

Hyder Ali (hī'der â'lē), a distinguished Indian prince, born in 1728, son of a general in the service of the Rajah of Mysore. By his military talents he became the actual ruler of Mysore, and in 1762 deposed Kandih Rao, and had himself chosen Rajah. He encouraged agriculture and commerce, reorganized the army, and so greatly extended his dominions that in 1766 they contained 84,000 sq. miles, and afforded an immense revenue. In 1780 he formed an alliance with the Mahrattas against the English, took Arcot, but was defeated by Sir Eyre Coote, June 1, 1781. The Mahrattas now joining in a league against him, he carried on a disadvantageous war, during the continuance of

Hyder Ali.

which he died, in 1782. He was succeeded by his son, Tippoo Saib.

Hydra (hī'dra), in Greek mythology, a celebrated monster, which infested the neighborhood of Lake Lerna, in the Peloponnesus. Some accounts give it a hundred heads, others fifty, others nine. As soon as one of these heads was cut off two immediately grew up if the wound was not stopped by fire. It was one of the labors of Heracles to destroy this monster, and this he effected with the assistance of Iolaus, who applied a burning iron to the wounds as soon as each head was cut off. See *Heracles.*

Hydra, an island of Greece, on the east coast of the Morea; length, 12 miles; breadth, about 3. Its surface, though not very elevated (highest point 1939 feet), is almost entirely composed of bare, sterile rocks; and the inhabitants, most of whom live in the town of Hydra, on the northwestern shore, are engaged in trade and commerce. During the war of independence the security which the island afforded raised its population for a time to 40,000; and the Hydriotes, with their fleet, played an important part in the struggle. Pop. of island, 7342; of the town, 6446.

Hydra (in zoölogy). See *Hydrozoa.*

Hydrangea (hī-dran'jē-a), a genus of shrubs or herbs of the nat. order Saxifragaceæ, containing

about thirty-three species, natives of Asia and America. The garden hydrangea (*H. hortensis*) is a native of China and was introduced into Britain by Sir J. Banks in 1790. It is a favorite for the beauty and size of its flowers.

Hydrates (hī'drātz), compounds of water with elementary substances or with other compounds. Hydroxide has much the same significance, but in the hydrate the water is supposed to retain its integrity, while in the hydroxide its elements have entered into new combinations.

Hydraulic Crane (hī-draw'lik), a crane wrought by the pressure of water applied on the principle of the hydraulic or hydrostatic press (which see). The mechanism consists of one or more such presses, with sheaves or pulleys and chains for the purpose of obtaining an extended motion in the chain from a comparatively short stroke of the piston. The power is applied not only for lifting the load, but also for swinging the jib, which latter object is effected by means of a rack or chain operating on the base of the movable part of the crane, and connected either with a cylinder and piston having alternate motion, like that of a steam-engine, or with two presses applied to produce the same effect by alternate action.

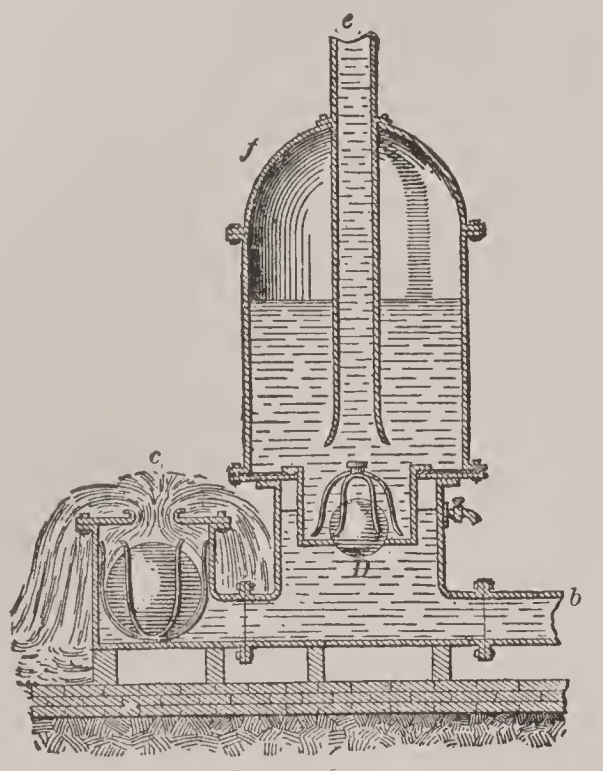
Hydraulicon (hī - draw'li-kon), an ancient musical instrument played by means of water; a water organ.

Hydraulic Engines, engines of which the motive power is water under pressure. In principle they do not differ essentially from steam engines, the water pressure acting on a piston or plunger in a cylinder, or on a revolving piston similar to that of a rotary steam engine.

Hydraulic Mining, a system of mining in which the force of a jet of water is used to sluice down a bed of auriferous gravel or earth, which is passed through sluices to detain the particles of gold.

Hydraulic Press, known also as *Hydrostatic Press* or *Bramah's Press.* See *Hydrostatic Press.*

Hydraulic Ram, a machine for raising water, and depending for its action on the impulse of flowing water. The water falling from a reservoir passes into a pipe or chamber (*b*), at the end of which there is a ball valve (*c*). The rush of supply water at first closes this, and the water finding no exit there acquires pressure enough to open another valve (*d*) and pass into an air vessel placed over it (*f*). The cessation of pressure at valve *c* allows it to fall again; an outrush of water takes place there, relieving valve *d*, which again closes. The pressure of the flowing water upon valve *c* once more closes this valve, and valve *d* again opens,



Hydraulic Ram.

and an additional quantity of water is forced into the air-vessel; and so on by a series of pulsations which send the water along the service pipe, and, in properly arranged machines, raise it to a very considerable height, although the impulse is derived only from the fall of a few feet.

Hydraulics, that part of mechanical science which has to do with conducting, raising and confining water, or of applying it as a motive power. It thus has to do with the flow of water in pipes or channels, and with the various machines in which water is utilized such as water wheels, pumps, turbines, the archimedean screw, the Barker's mill, the hydraulic ram, the hydraulic crane, the hydraulic press, etc.

Hydride (hī'drīd), a substance consisting of hydrogen combined with a metal, or some other base.

Hydro-Aeroplane. See *Hydroplane.*

Hydrocarbons (hī-dru-kâr'bunz), in chemistry a series of compounds which consist of carbon and hydrogen only. They are produced chiefly by the decomposition of organic substances, either slowly by natural causes, or by artificial means, as in the case of

the destructive distillation of coal for the purpose of making gas. Certain of the hydrocarbons are also found in the gums which exude from trees. Among the best known are paraffin, benzine and turpentine.

Hydrocele (hī'dro-sēl), a collection of serous fluid in some of the coverings of the testicle or spermatic cord, or in the areolar texture of the scrotum. It is generally the result of a strain or an inflammation of the testes. A large tumor is formed, filled with fluid, which has often to be drawn off three or four times a year. A radical cure may be effected by setting up an inflammation which brings the opposite surfaces of the sac into adhesion, and thus obliterates the cavity.

Hydrocephalus (hī - dru-sef'a-lus), an accumulation of fluid within the cavity of the cranium; dropsy of the brain. See *Dropsy*.

Hydrocharidaceæ (hī - dru - char - i-dā'se-ē), a nat. order of monocotyledonous floating and creeping plants, inhabiting ditches, rivers and lakes in various parts of the world. The genus *Anacharis* belongs to it. See *Anacharis*.

Hydrochloric Acid (hī - dru-klō'-rik), or MURIATIC ACID (H Cl), a gaseous compound of equal volumes of hydrogen and chlorine. It is evolved during volcanic eruptions, and is found in the water which collects in the crevices of mountains, as well as in rivers which take their rise in volcanic formations, especially in South America. It may be produced by decomposing common salt with sulphuric acid, or by bringing equal volumes of chlorine and hydrogen together and exposing the mixture to diffused daylight without condensation. It explodes in direct sunlight. Hydrochloric acid is colorless, has a pungent odor and an acid taste. It is quite irrespirable, extinguishes flame and dissolves very readily in water. The chief use of hydrochloric acid in the arts is to supply chlorine to the bleaching-powder manufacturer. It is also used in the preparation of glue, phosphorus, carbonic acid, artificial waters, etc. In medicine it is used diluted as a tonic and astringent. In a concentrated form it is a powerful caustic.

Hydrochloric Ether. See *Chloric Ether*.

Hydrocyanic Acid (hī-dru-sī-an'-ik). Same as *Prussic Acid* (which see).

Hydrodynamics (hī - dru - dī-nam'-ikz), a branch of the general science of dynamics, treating specially of the laws of force as applied to fluids. It is divided into *hydrostatics*, which is concerned with forces applied to fluids at rest, and *hydrokinetics*, which treats of the application of forces so as to produce motion in fluids. The term hydrodynamics is, however, very often used in the latter sense, being thus opposed to hydrostatics. The name *Hydraulics* is given to the subject when considered with respect to its practical bearing on engineering science.

Hydro-electric Machine, a machine in which electricity is generated by the friction of steam against the sides of orifices through which it is allowed to escape under high pressure.

Hydrofluoric Acid (hī - dru - flûr'-ik), or FLUOHYDRIC ACID (H F), an acid which may be obtained either in the liquid form or in the anhydrous form, as a colorless gas. Both the dry and the liquid form act upon the skin with great virulence. Hydrofluoric acid is used chiefly for etching upon glass. The glass is covered with a thin coating of etching wax, and the design is traced through the wax down to the glass with a fine-pointed instrument. The plate is then treated with an aqueous solution of the acid or is exposed to the gas itself. After a sufficient length of time the wax is dissolved away and the design becomes visible. In chemistry hydrofluoric acid is used to decompose and dissolve silicates in mineral analysis.

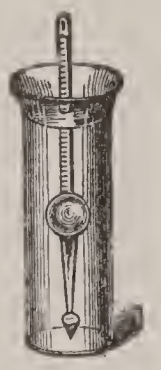
Hydrogen (hī'dru-jen), an important elementary substance, one of the elements of water and a component of all vegetable and animal products. It may be obtained by passing the vapor of water over red hot iron filings, or by submitting water to the action of an electric current, whereby it is decomposed into its elements hydrogen and oxygen. Pure hydrogen is a colorless, tasteless, inodorous gas; it is very inflammable, burning with a pale, very slightly luminous, but intensely hot flame; it is a powerful refractor of light; the least dense and the most rapidly diffusible of all the gases and the lightest body in nature, being about 14½ times lighter than atmospheric air, with a specific gravity of .0693. In consequence of its extreme lightness it is the recognized standard of unity in referring to the atomic weight of bodies, and it has also been assumed as the unit in speaking of the specific gravity of gases, although common air is the more generally received standard. Hydrogen cannot support respiration, but is not directly poisonous,

death ensuing from mere absence of oxygen. Two volumes of hydrogen with six of air form an explosive mixture. The most intense heat that can be produced is caused by the burning of hydrogen in oxygen gas, and this principle has been applied to increase the temperature of blast-furnaces in iron-works by making the gases pass separately through heated tubes to the furnace. Hydrogen is only slightly soluble in water, nor is there any other liquid which is capable of dissolving it in great quantity. Hydrogen gas can be liquefied by exposure to 650 atmospheres pressure and —140°C., but remains liquid at 320 atmospheres pressure, the temperature remaining the same. It was solidified in 1899 by causing it to evaporate when in the liquid state. It unites with all other elementary gaseous bodies, and forms with them compounds, not only of great interest, but of vast importance and utility; with nitrogen it forms ammonia; with chlorine, hydrochloric acid; with fluorine, hydrofluoric acid, etc.

Hydrography (hī-drog'ra-fi), that branch of geographical science which has for its object the description and natural phenomena of the water on the surface of the globe, whether in seas, lakes, or rivers. It may deal with the rivers, watersheds, lakes, etc., of a particular country; and it also embraces the determination of winds, currents and other departments of marine surveying. In Britain, France, the United States, etc., there are hydrographic departments kept up by government, which publish accurate charts of coasts, issue sailing directions, etc.

Hydrokinetics (hī-dru - kī-net'ikz), that branch of hydrodynamics which treats of the application of forces producing motion in fluids, having thus to do with the flow of liquids in pipes, its issue from orifices under certain pressures, etc. See *Hydrodynamics*.

Hydrometer (hī-drom'e-tėr), an instrument primarily for determining the specific gravity of fluids, though some of them can also determine the specific gravity of solids. The hydrostatic principle on which the use of the hydrometer depends is the well-known one that when a solid body floats in a liquid, and thus displaces a quantity of the liquid, the weight of the solid body is equal to the weight of the liquid that it displaces. The density of the liquid is determined either by observing the depths to which the hydrometer sinks in the liquid (the hydrometer of variable immersion) or the weights required to make it sink to a given depth (the hydrometer of constant immersion). Of the second kind of hydrometer Nicholson's is a good example. It consists of a hollow cylinder of metal, surmounted with a very fine metallic stem, to the top of which there is attached a plate or pan for weights. From the bottom of the metallic cylinder hangs a kind of cup or basket. The whole instrument is weighted so as to float upright. On the fine metallic stem there is a marked point; and by putting weights on the upper pan the hydrometer is always made to sink precisely to this point. Thus the volume immersed is always the same. From what was said above, it is seen at once that different weights are required to sink it to the marked point in different liquids, the denser the liquid the greater being the weight required; and if the weight of the instrument itself is known, and also the *standard weight*, or weight required to sink it to the marked point in distilled water, the calculation of the specific gravity of any liquid from an observation with the instrument is very easy. But the specific gravity of solids can also be found by means of Nicholson's hydrometer, for which purpose the instrument is placed in distilled water and the solid body is put on the upper pan. Weights are then added till the hydrometer sinks to the marked point. But the *standard weight* of the instrument being known, it is plain that the difference between it and the weights that must be added on the upper pan to the weight of the body whose specific gravity is to be determined must be the weight in air of that body. The body is now transferred to the basket below the instrument, and the additional weights which must now be placed in the dish represent the weight of water displaced by the solid; and the weight of the solid itself divided by this weight is the specific gravity required. Hydrometers of variable immersion are usually made of glass. Each of them has a large hollow bulb, below which there is a smaller bulb weighted with mercury to make the instrument float upright. The stem is cylindrical and is graduated, the divisions being frequently marked on a piece of paper inclosed within the stem. The depth to which the hydrometer sinks in the liquid gives the density.


Hydrometer

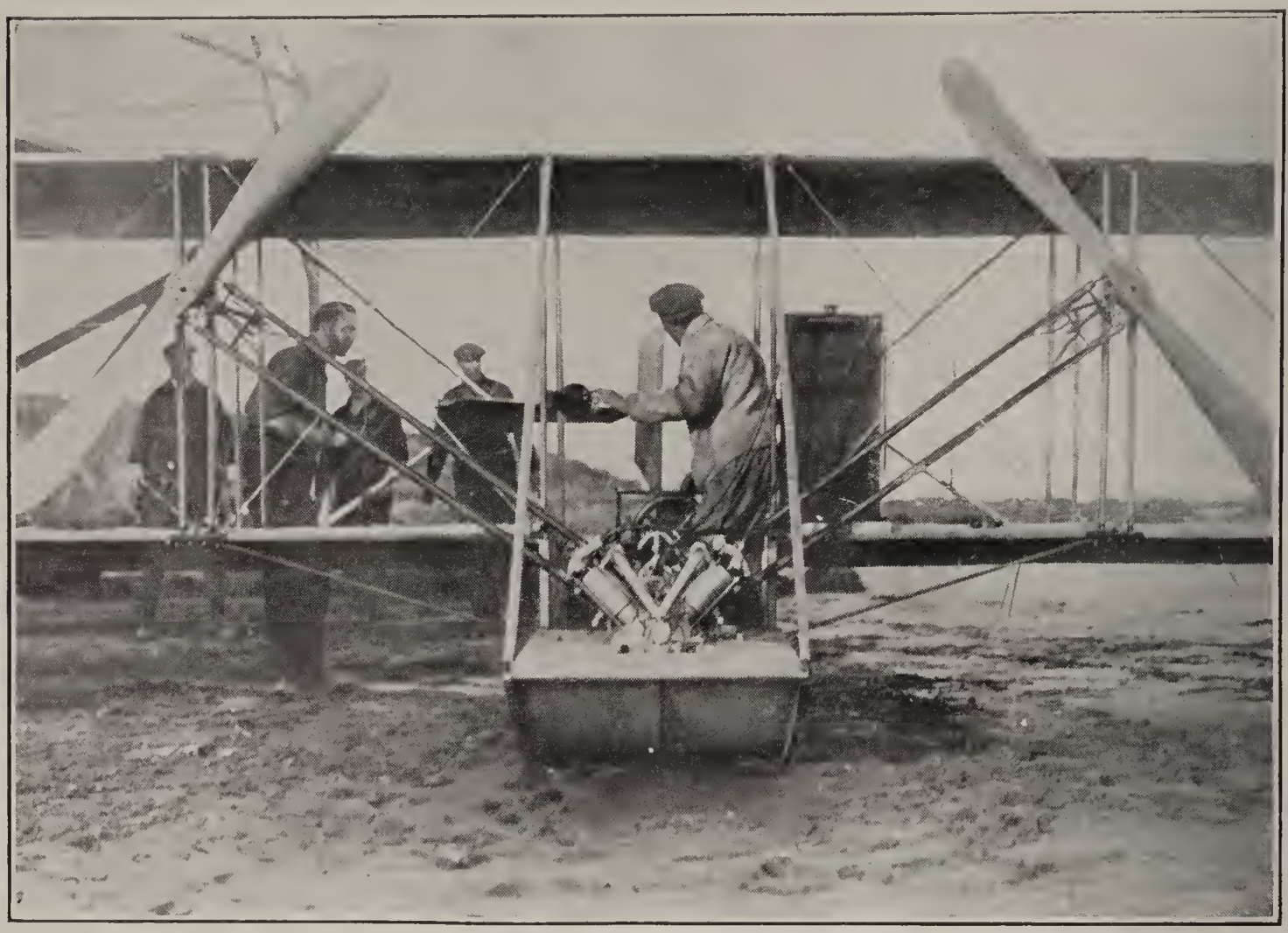
Hydromys (hī'drō-mis), a genus of water-mice found in Australia and adjacent islands, distinguished

from all other rodents by its small number of molar teeth. The largest species is twice the size of a common rat. In Tasmania they are called beaver-rats, are nocturnal and very shy, inhabit the banks of both fresh and salt water, and swim with the help of partly-webbed hind feet.

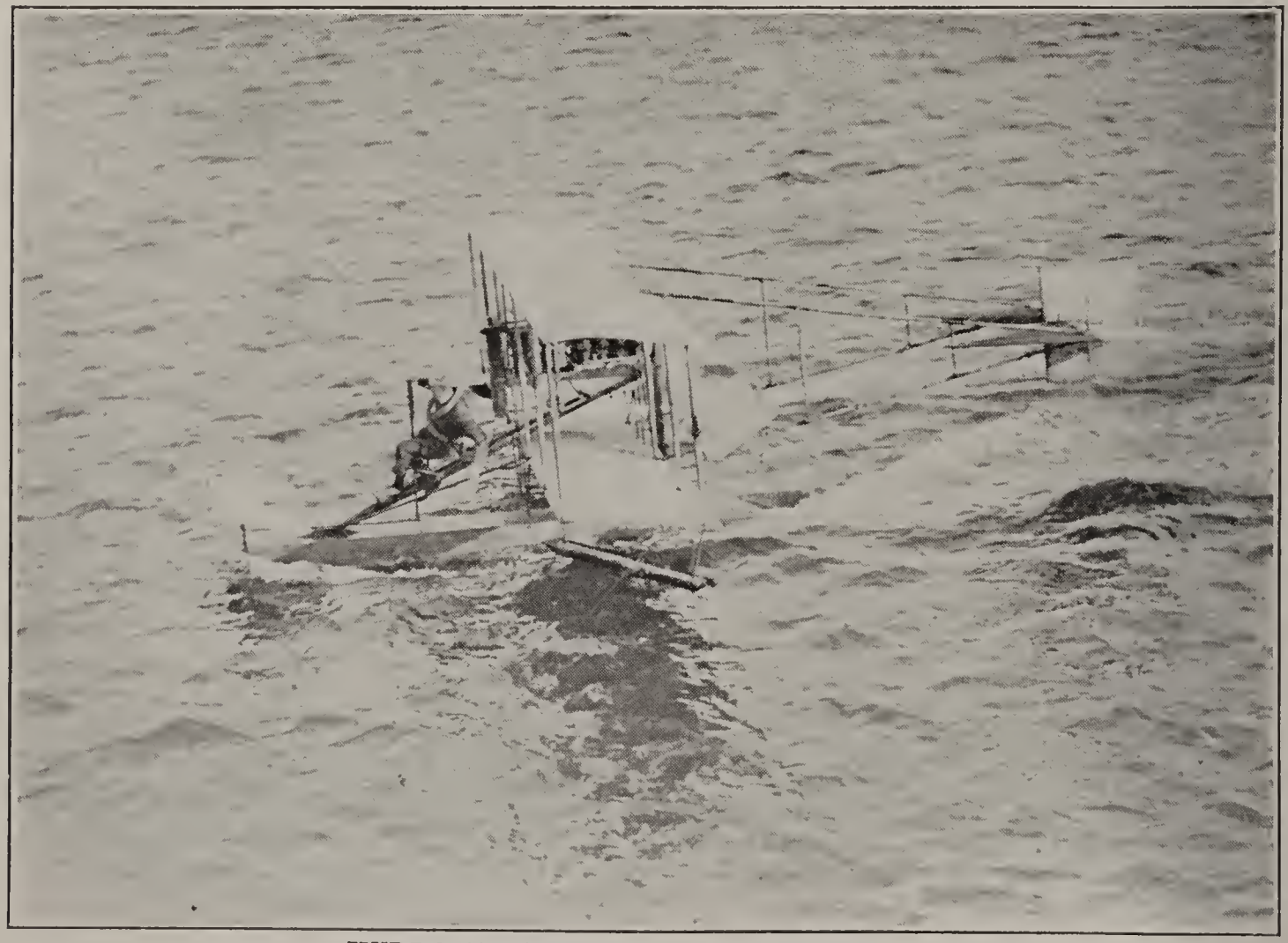
Hydropathy (hī-drop'a-thi), a method of treating diseases by the use of pure water both internally and externally, which has come extensively into practice. The system was originated by Vincent Priessnitz, a Silesian peasant, who in 1829 established at his native village of Gräfenberg an institution for the hydropathic treatment of diseases, and invented a variety of forms in which the water cure might be applied, such as the wet-sheet pack, the dry blanket or sweating pack, the sitz, douche, plunge, wave, etc., baths. The new system soon acquired popularity, and the original establishment expanded into an extensive suite of buildings. Other hydropathic institutions soon sprung up in other parts of Germany. In 1842 a hydropathic society was formed in London, and ere long numerous establishments were erected all over the United Kingdom. Before Priessnitz's death in 1851 he had the satisfaction of seeing his system adopted throughout Europe, as well as in the United States, where it was introduced in 1843 and spread widely, though it is now li de used. In many cases there can be no doubt of patients having received great and lasting benefit by a sojourn at a hydropathic institution, and the free use of water in its various forms of appliance; but it may well be doubted whether these advantageous results are not as much to be attributed to the ablutions, exercise and diet to which in such circumstances the patients readily conform themselves as to the wet bandages, douches and other forms of hydropathic treatment.

Hydrophane (hī'dru-fān), a variety of opal, made transparent by immersion in water. See *Opal.*

Hydrophobia (hī-dru-fō'bi-a; Greek *hydōr*, water, and *phobos*, fear), a specific disease arising from the bite of a rabid animal. The animals most liable to be afflicted with madness are dogs; but cats, wolves, foxes, etc., are also subject to it. The early symptoms of rabies in the dog are such as restlessness and general uneasiness, irritability, sullenness and inclination for indigestible and unnatural food, and often a propensity to lap its own urine. As the disease proceeds the eyes become red, bright and fierce, with some degree of strabismus or squinting; twitchings occur round the eye, and gradually spread over the whole face. After the second day the dog usually begins to lose perfect control over the voluntary muscles. He catches at his food, and either bolts it almost unchewed, or, in the attempt to chew it, suffers it to drop from his mouth. The want of power over the muscles of the jaw, tongue and throat increases until the lower jaw becomes dependent, the tongue protrudes from the mouth, and is of a dark, and almost black color. A peculiar kind of delirium also comes on, and the animal snaps at imaginary objects. His thirst is excessive, although there is occasionally a want of power to lap. His desire to do mischief depends much on his previous disposition and habits. He utters also a peculiar howl, and his bark is altogether dissimilar from his usual tone. In the later stages of the disease a viscid saliva flows from his mouth, and his breathing is attended with a harsh, grating sound. The loss of power over the voluntary muscles extends, after the third day, throughout his whole frame, he staggers in his gait, and frequently falls. On the fourth or fifth day of the disease the dog dies, sometimes in convulsions, but more frequently without a struggle. In regard to man the rabid virus seems to be more violent when it proceeds from wolves than from dogs. It appears to be contained solely in the saliva of the animal, and does not produce any effect on the healthy skin. But if the skin is deprived of the epidermis, or if the virus is applied to a wound, the inoculation will take effect. The development of the rabid symptoms is rarely immediate; it usually takes place before the twenty-first day, but in some cases it has been reported as having occurred after six months or even longer. It begins with a slight pain in the scar of the bite, sometimes attended with a chill; the pain extends and reaches the base of the breast, if the bite was on the lower limbs, or the throat, if on the upper extremities. The patient becomes dejected, morose and taciturn. He prefers solitude, and avoids bright light; frightful dreams disturb his sleep; the eyes become brilliant; pains in the neck and throat ensue. These symptoms precede the rabid symptoms two or three days. They are followed by a general shuddering at the approach of any liquid or smooth body, attended with a sensation of oppression, deep sighs and convulsive starts, in which the muscular strength is much increased. A foamy, viscid saliva is discharged from the mouth; the deglutition of solid matters is difficult;



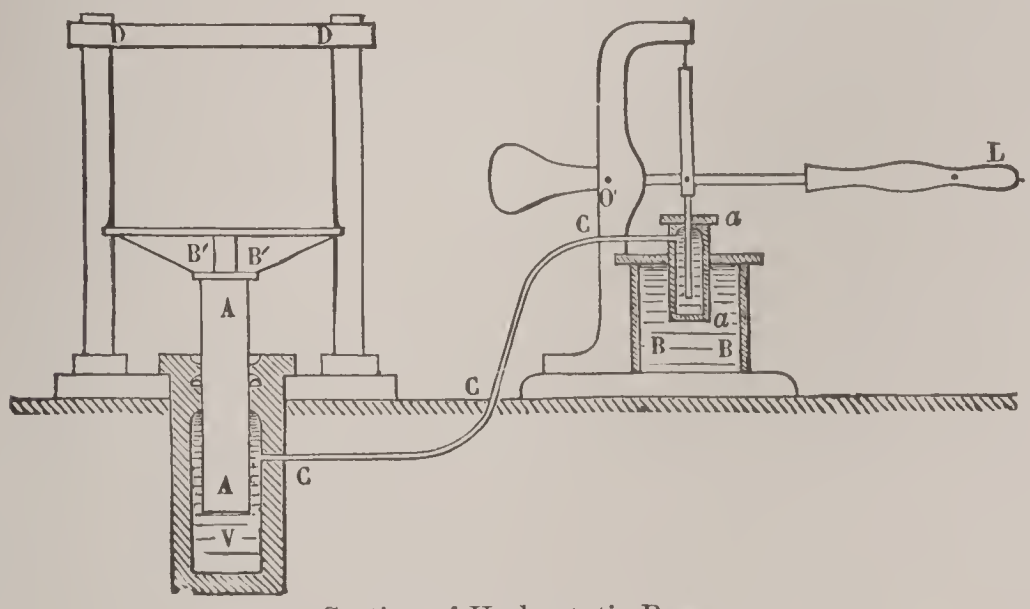
CURTISS HYDRO-AEROPLANE



HYDRO-AEROPLANE IN THE WATER

The new type of Curtiss flying boat of 60 horsepower, which is capable of making 50 miles per hour in the water and 60 miles per hour in the air. It will withstand any wind or wave safe for a boat of its size.

the respiration hard; the skin at first, chilly, and afterwards covered with sweat; the pulse weak; the fit is often followed by a syncope; the fits return at first every few hours, then at shorter intervals, and death takes place generally on the second or third day. No means have yet been found of arresting the progress of the poisonous virus after it has once developed in the system. The treatment, therefore, consists in preventing its development. which may be effected by applying a ligature, where possible,



Section of Hydrostatic Press.

to impede the circulation from the wound, by sucking it, and thoroughly cauterizing it either with nitrate of silver or with iron heated to a white heat, the pain of cautery being less as the temperature is greater. If these means are not available, any burning substance and most acids may be used. M. Pasteur discovered a method of preventing the development of the disease by a system of successive inoculations with rabid virus of greater and greater intensity; the inoculation being made the first day with marrow extracted from a rabid animal 12 to 14 days previously, the second day with fresher marrow, continuing until marrow only one day old is used. The result of this treatment is claimed to confer immunity from infection. While this method has been favorably received, many doubt its efficacy, especially the anti-vaccinationists, and question the number of cures really performed. As a sharp critic of the Pasteur system has remarked, every one who is bitten and inoculated is counted in M. Pasteur's list, though there is nothing to prove that he would have contracted the disease.

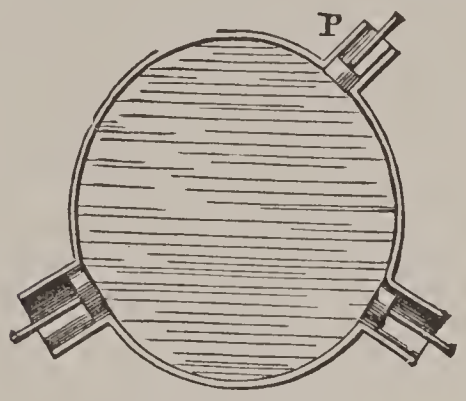
Hydrophora (hī-drof'or-a), one of the three divisions into which Huxley and other authors divide the Hydrozoa, the other two being the Discophora and the Siphonophora.

Hydroplane (hī'drō-plān), a motor boat so built as to sink but little in the water, and when driven at high speed rising so as practically to glide over the surface, or to rise in the air. It combines the principles of the aeroplane and the motor boat.

Hydrostatic Press (hī-dru-stat'-ik), or Bramah's Press, a hydrostatic apparatus which in its practical application was invented by Bramah in 1796. It will be understood from the accompanying figure. By means of a suction and force pump, *a a*, worked by the lever or handle L turning about the point O, water is drawn from the reservoir B B and forced along the tube C C into the cistern V through the top of which a heavy metal plunger A A works. On the upper end of the plunger is a large plate B′ B′ upon which the goods to be pressed are placed. When water is pumped from the reservoir B B into the cistern V, the pressure exerted by the plunger of the pump is transmitted according to the well-known hydrostatic principle (see *Hydrostatics*) to the bottom of the plunger A, which accordingly rises and carries the objects placed on plate B′ B′ up against the top of a fixed frame D D. It was the invention by Bramah of a water-tight leather collar surrounding the piston that made the use of the press practicable; before his invention not much power could be developed from the escape of the water round the piston. The collar consists of a leather ring bent so as to have a semicircular section (as seen in cut), so that the water passing between the piston and cylinder fills the concavity of the collar, and by pressure produces a packing which fits the tighter as the pressure on the piston increases. The hydrostatic press may be constructed to give pressures of two or three hundred tons, and is extensively employed where very great force is required, as in testing anchors or raising very heavy weights.

Hydrostatics, is that part of the general science of hy-

drodynamics that treats of the application of forces to fluids at rest. Among the chief principles of hydrostatics may be mentioned the following: (1) The intensity of pressure at any point of a fluid is the same in all directions; it is the same whether the surface that receives the pressure faces upwards, downwards, horizontally or obliquely. (2) When a fluid is confined, if the intensity of pressure in one part be increased, as by forcing in a piston or by any other means, an equal increase will be produced in the intensity of pressure at all other parts: in other words, pressure applied to any one part



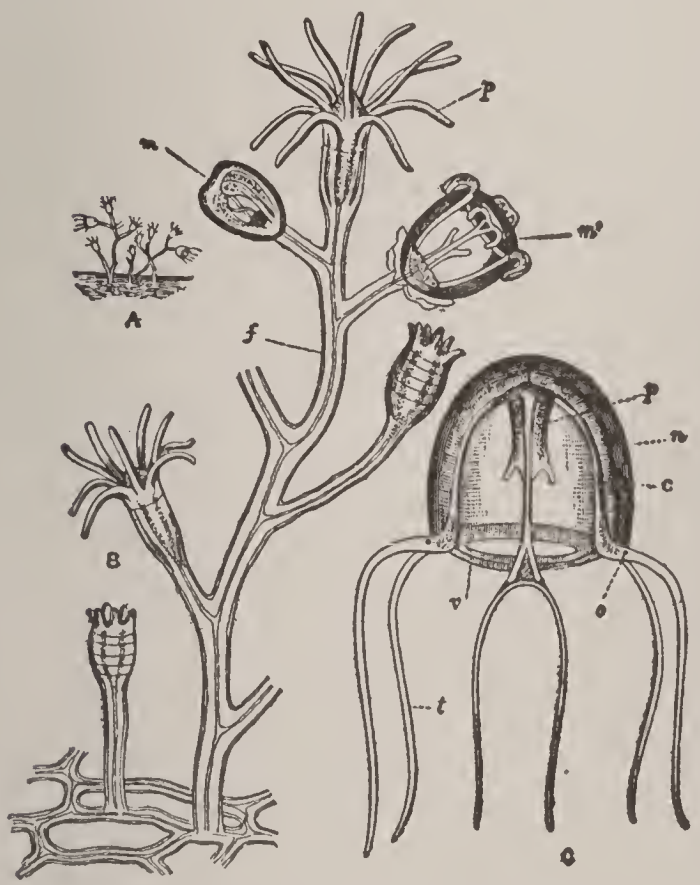
Pascal's Principle.

is transmitted without any change in its intensity to all other parts. The diagram will aid in the understanding of this. If pressure is applied to P it will be transmitted in all directions through the liquid. If other openings are made, and if they are fitted with pistons, the pressure that must be applied to any piston equal in area to the area of P is equal to the pressure on P; and if the area of one of the other pistons is greater or less than the area of P, the pressure required to keep it in its place is proportionately greater than or less than the pressure that is applied to P. This principle, which is known as Pascal's principle from being distinctly formulated by him, is the most important in hydrostatics, and finds a practical application in the Hydrostatic, or Bramah's Press (see above). (3) Not only is pressure transmitted out to the surface or envelope of the liquid, but within the fluid itself the particles are all pressed together. When a solid is immersed in the liquid it is pressed at every point of its surface in the direction perpendicular to the surface at that point. (4) In every horizontal layer throughout the liquid the pressure per unit area is the same; and this is the case independently of the shape of any vessel in which the liquid may be contained. The pressure per unit area in any horizontal layer depends only on the height of the free surface of the liquid above the layer considered, and the specific gravity of the liquid; and it is equal to the weight of a column of the liquid of unit sectional area whose height is the height of the free surface. Hence whatever be the shape or size of several vessels, if all have the same area of base, and if in all the water stands at the same height, the pressure on each of the bases is the same. (5) When a solid is immersed either partially or wholly in a liquid a portion of the liquid is displaced. The solid is at the same time pressed at every point by the liquid. But the upward pressure on the solid is greater than the downward by an amount equivalent to the weight of the liquid displaced by the solid. Hence we obtain what is called the principle of Archimedes, namely, that a body immersed either wholly or partially in a fluid loses a portion of its weight equal to that of the fluid which it displaces. This principle is of great importance as regards the flotation of bodies, and the determination of specific gravity, etc. In regard to the sinking or floating of bodies three different cases may thus arise: First, the weight of the body may exceed the weight of the liquid it displaces, in which case the body sinks in the liquid; Second, the weight of the body may be less than that of the liquid displaced, in which case the body will not remain submerged unless forcibly held down, but will rise to the top and partly out of the liquid until the weight of the liquid displaced is equal to its own weight; Third, the weight of the body may be equal to the weight of the liquid displaced, in which case it will have little or no tendency either to sink or rise.

Hydrosulphuric Acid (hī-dru-sul-fū′rik), or sulphuretted hydrogen, or hydrothionic acid (H_2S), is a colorless, inflammable gas produced by the putrefaction of sulphurous organic matters. Many mineral waters contain it naturally. It may be artificially produced by burning sulphur vapor in hydrogen, or by passing hydrogen through sulphur. It has a sweet taste but a very nauseous odor as of rotten eggs. It has poisonous effects when breathed, and experiments have shown that birds perished in air which contained $\frac{1}{1500}$th part of the gas.

Hydrothorax (hī-dru-thō′rakz), a dropsical condition of the pleura, in which the pleural cavity contains a serous fluid exuded from the blood-vessels, not due to inflammation. It may be the result of organic disease in the heart or kidneys, or of pressure on vessels obstructing the return of blood.

Hydrozoa (hī-dru-zō′a), a class of animals of the subkingdom Cœlenterata, in which the walls of the body inclose a simple undivided cavity which acts both as a body cavity and a digestive cavity. The body is essentially



A, Part of the colony of *Bougainvillea muscus*, one of the compound *Hydrozoa*, of the natural size. B, Part of the same enlarged: *p*, A polypite fully expanded; *m*, An incompletely developed reproductive bud; *m′*, A more completely developed reproductive bud; *f*, Cœnosarc withits investing periderm and central canal. C, A free reproductive bud or medusiform gonophore of the same: *n*, Gonocalyx; *p*, Manufrium; *c*, One of the radiating gastrovascular canals; *o*, Ocellus; *v*, Velum; *t*, Tentacle. (After Allman.)

composed of two layers, an outer layer or ectoderm and an inner or entoderm. Reproductive organs are developed as external processes of the body-wall, but reproduction also takes place by fission. The Hydrozoa are all aquatic and almost all marine. The fresh-water hydra is a very good type of the class. The body is quite soft, and when fully contracted appears like a particle of matter resting on the surface of a plant or stone; but when expanded it shows a long slender body of a bright green or light brown color. One end of the body develops into a number of long slender tentacles, within which, near their bases, the mouth of the animal is found. This is the *distal* or free-growing end. The other and more slowly growing end is known as the *proximal*, and ends in a kind of disc or foot by which the hydra attaches itself to objects. The body is hollow from one end to the other. It is found most in semistagnant waters, where, hanging from its foot-disc, with its long tentacles expanded, it seizes on the small crustaceans or other suitable prey which comes in contact with it. Its tentacles have a stinging power which soon paralyzes its prey. Under favorable conditions one or more hydræ are usually found attached to the parent form. Such are produced by a process of budding from the parent. Each of these ultimately separates from the parent stem and becomes an independent hydra. The Hydrozoa are divided by Prof. Nicholson into six subclasses, viz., the Hydroida, the Siphonophora, the Lucernarida, the Graptolitoidea, the Hydrocorallinæ and the Stromatoporoidea.

Hyena (hī-ē′na), a genus of digitigrade carnivorous quadrupeds, constituting a family which unites the skull characters of the Felidæ (cats) with the skeleton and gregarious habits of the Canidæ (dogs). The characters of this genus are five molars above, and five or four below, on each side, the three anterior molars being conical, smooth, and remarkably large, adapted for breaking the bones of their prey; the tongue is rough; the legs are each terminated by four claws; the forelegs are longer than the hind legs; the eyes large and prominent; the ears long and acute; the jaws are remarkable for the strength of their muscles, and can crush the hardest and most massive bones with ease. The genus is confined to Africa and Asia. There are three species known—

Striped Hyena (*Hyæna striāta*)

the striped hyena (*Hyæna striāta*), the spotted (*H. crocūta*), and the brown hyena (*H. brunnea*). They are nocturnal animals, extremely voracious, feeding chiefly on carrion, and thus being of great utility in the countries where they live; to obtain dead bodies they will even dig up graves. Along with the true hyenas, the aardwolf of South Africa is also included in the family of Hyænidæ. An

extinct species, the *cave hyena* (*H. spelæa*) was abundant in England, France and Germany anterior to the glacial epoch, and has left its remains in many caves of these countries.

Hyères (ē-ār), a town of Southern France, department Var, 10 miles east of Toulon, beautifully situated on a declivity facing the Mediterranean. It is much frequented by patients suffering from chest or nervous disorders. Pop. (1906) 17,790.

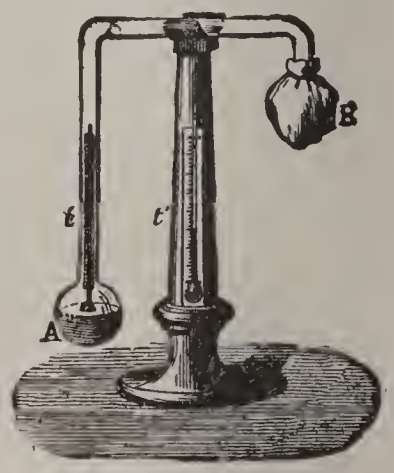
Hyères Islands, a group of islands in the Mediterranean, on the coast of France a little south of Hyères. Pop. 5755.

Hygieia (hī-ji-ē′ya), the Greek goddess of health, daughter of Asclepios, or Æsculapius. Her temple was placed near that of Æsculapius, and her statues were even erected in it. She is represented as a blooming maid with a bowl in her hand, from which she is feeding a snake, the symbol of health.

Hygieia, from antique statue.

Hygiene (hī′ji-ēn), the department of medicine which treats of the preservation of health, and the duration of life prolonged by a due attention to physiological or natural laws. It is usually divided into public and private hygiene, the former having to do with measures for excluding causes of disease (see *Quarantine* and *Vaccination*), methods of securing cleanliness in the streets and dwellings (see *Sanitation* and *Sewage*), methods of maintaining the purity of the supply of food and drink (see *Adulteration*); the latter may be considered to embrace such subjects as alimentation (see *Aliment*, *Digestion* and *Dietetics*), clothing (see *Clothing*), exercise and muscular development (see *Gymnastics*), etc.

Hygrometer (hī-grom′e-tėr), an instrument for measuring the degree of moisture of the atmosphere. The chief classes of hygrometers depend either upon absorption or upon condensation. Of the former kind is the hygrometer of Saussure, in which a hair, that expands and contracts in length according as the air is more or less moist, is made to move an index. Of the latter sort is Daniell's hygrometer. This instrument consists of a bent glass tube, terminating in two bulbs, the bulb A being two-thirds filled with sulphuric ether, and the bulb B being, at the commencement of an experiment, empty. The latter is covered with muslin. In process of construction the tube is exhausted of air, and is thus filled with vapor of ether through its entire length. A thermometer (*t*) whose bulb is immersed in the ether of the lower arm, is inserted in the tube to register variation of temperature, and a second thermometer (*t′*) is attached to the stand of the instrument, to show the temperature of the outer air. If sulphuric ether be dropped on the bulb B, as it evaporates the bulb is cooled, and the vapor of ether is condensed within it from the bulb A; while owing to the evaporation from A into B the temperature of the former gradually falls. The operation is carried on till the temperature of A is so far reduced that dew from the surrounding air just begins to condense upon it. By means of the thermometer contained in A the temperature is read off at the instant at which vapor begins to condense, and the dew-point is thus obtained. The *hygrometric condition*, that is, the ratio between the quantity of moisture that the air actually contains and the quantity which it is capable of containing at the existing temperature, is then easily deduced. Regnault's hygrometer is a modification of the principle of Daniell's instrument, the ether being evaporated by forcing air through it.



Daniell's Hygrometer.

Hykshos. See *Hycsos*.

Hylæosaurus (hī-lē-o-sạ′rus), a gigantic fossil lizard discovered in the Wealden formation of Tilgate Forest, England. Its probable length was about 25 feet. It is one of the Ornithoscelida, the group which presents a structure intermediate between that of existing birds and reptiles.

Hymen (hī′men), HYMENÆUS, the god of marriage in Greek mythology. No marriage took place without his being invoked to sanction it. He is described as having around his brows the flowers of marjoram, in his left hand the flame-colored nuptial veil, in his right

the nuptial torch, and on his feet golden sandals. He is a taller and more serious Eros, and is accompanied by song and dance.

Hymenoptera (hī-men-op′tĕr-a; Gr. *hymēn*, a membrane, and *petron*, a wing), an extensive order of insects, comprising bees, wasps, ants, ichneumon-flies, gall-flies and allied insects. They are characterized by four membranous naked wings which have comparatively few veins. The second pair of wings is always smaller than the first. The mouth parts are provided with biting jaws and a suctorial organ. The head is freely movable, and besides the lateral compound eyes there are usually

Hymenoptera. *a*, Winged male of ant; *b*, wingless worker of ant; *c*, Pupa of ant; *d*, larva of ant enlarged; *e*, the great sawfly (*Sirex gigas*).

three ocelli on the top of the head. The Hymenoptera undergo complete metamorphosis. Females have the extremity of the abdomen furnished either with an ovipositor, forming a boring organ (*terebra*), or a sting (*aculeus*). Hence the two suborders into which Hymenoptera are divided: *Terebrantia*, comprising the sawflies, gall-flies, ichneumon-flies, etc., and the *Aculeāta*, which include the bees, wasps, ants, hornets, etc.

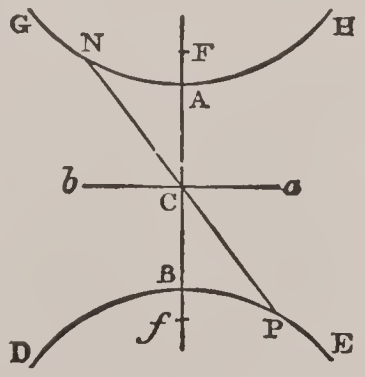
Hymettus (hī-met′us), a mountain in Attica, now called *Trelovouni*, southeast of Athens, distinguished among the ancients for the excellence of its marble and its honey. The latter is still in repute.

Hymn (him), originally a song of praise sung in honor of gods and heroes on festivals, with the accompaniments of music and dancing. Among the Hindus the hymns of the Rig-Veda, among the Hebrews the psalms, and among the Greeks the so-called Orphic and Homeric hymns are good examples. The early Christian hymns are full of devotional feeling. Their use dates from the first days of the church; but the names of the authors even of the more modern hymns cannot be discovered with certainty, though Prudentius, Paulus Diaconus and Thomas Aquinas are known to have composed some of the most esteemed. The use of hymns was sanctioned by the fourth council, at Toledo, in 633. Several of them have names derived from the words with which they begin, as the *Te Deum*, the *Gloria Patri*, etc.

Hyoid Bone (hī′oid), in anatomy, a bone shaped somewhat like the letter U, but with a wide bend and shorter limbs in proportion to the body, and having two pairs of upward projections or *cornua* (horns). It is suspended horizontally in the substance of the soft parts of the neck between the root of the tongue and the larynx.

Hyoscyamus (hī-os-sī′a-mus). See *Henbane*.

Hypatia (hī-pā′she-a), a Greek female philosopher of the eclectic school, the daughter of Theon, a celebrated astronomer and mathematician of Alexandria towards the close of the fourth century after Christ, at which period she was born. Her father taught her not only all the branches of polite learning, but also geometry, astronomy and finally philosophy. She acquired a great reputation in the latter study, and as a preceptress in the school of Plotinus gathered a numerous auditory of students from all parts of the East. She was as virtuous and beautiful as she was learned. But the zeal and the opposition of Cyril, the Patriarch of Alexandria, were aroused at the influence exercised by Hypatia; the lower and more ignorant clergy in particular were stirred against her, and at length a number of them having excited a popular tumult, seized her as she was returning from the schools, dragged her through the streets of Alexandria, stripped her naked, and finally murdered her with circumstances of the greatest barbarity (415). Charles Kingsley chose the story of Hypatia as the subject of an interesting historical romance.



Hyperbola—D B E, G A H, are opposite hyperbolas; F, *f*, foci; C, center; A B, transverse axis; *a b*, conjugate axis; N C P, a diameter.

Hyperæmia (hī-per-ē′mi-a), an excessive flow of blood to any structure of the body.

Hyperbola (hī-pĕr′bo-la), in geometry, a curve formed by

cutting a cone in a direction parallel to its axis, or so that the cutting plane makes a greater angle with the base than the side of the cone makes, and when produced cuts also the opposite cone, or the cone which is the continuation of the former, on the opposite side of the vertex, thus producing another hyperbola, which is called the opposite hyperbola to the former one.

Hyperbole (-bo-lē), a rhetorical figure, in which an idea is expressed with a fanciful exaggeration of phrase which is not to be taken too literally, but only as representing a certain warmth of admiration or emphasis. 'His fame reaches to the stars' is an example of hyperbole.

Hyperboreans (hī-per-bo-rē'anz), an ancient name for a mythical people, supposed to dwell in the extreme north of the earth. They were favorites of Apollo, and dwelt in an earthly paradise in everlasting youth and health. In modern times the term is applied to certain trees of Northeast Asia and Northern America.

Hyperdulia. See *Dulia.*

Hypericaceæ (hī-per-i-kā'se-ē), HYPERICI'NÆ, a nat. order of plants, of which the genus *Hypericum* or St. John's wort is the type. They are herbs, shrubs, or (rarely) trees, with simple, opposite (rarely whorled) leaves. They have terminal or axillary, solitary, cymose or paniculate flowers, usually yellow or white. These plants are much spread; they abound in resinous juice, and many possess medicinal properties.

Hyperæsthesia (hī-per-ēz-thē'si-a), a word indicating an excessive sensibility of the nerves of sensation, special or general. In this condition the slightest stimulus may cause a paroxysm of pain, as in tic-douloureux. In the case of the spinal nerves, bright flashes of light may be seen, sounds heard, and smells and tastes experienced with no apparent cause. Hysteria is the disease most likely to bring on this condition, but it is sometimes induced by rheumatism, gout, skin diseases, etc., and often adds to the distress in the early stages of various fevers.

Hyperides (hī-pėr-ī'dēz), an Athenian orator, the pupil of Plato and Isocrates, born about 400 B.C. Along with Demosthenes and Lycurgus he was one of the leaders of the patriotic and anti-Macedonian party. As an orator he was especially distinguished for his grace and subtlety of expression, as well as for his tact in handling the question under consideration. He was murdered at Ægina by the emissaries of Antipater in 322 B.C. Of his orations one has reached us nearly entire; the others only in fragments.

Hyperion (hī-pėr-ī'on or hī-pē'ri-on), in the most ancient mythology of Greece, the god of the sun, afterwards identified with Apollo; also one of the Titans.

Hypersthene (hī'pėr-sthēn), a mineral of a color between grayish and greenish black, but nearly copper-red on the cleavage. It was first found on the coast of Labrador, and was called Labrador hornblende.

Hypertrophy (hī-per'tru-fė), literally over-nourishment, is an excessive development of the body or any of its organs by actual increase of the particular parts composing it, as increase of muscular fibre in the heart. It arises from continued oversupply of blood to the part, due it may be to chronic irritation of the part, as for example thickening of the skin in the neighborhood of a chronic ulcer; or it may be due to excessive use of the part. The cure of hypertrophy is attended with difficulty. The diseased organ must be kept at rest if possible.

Hyphomycetes. See *Fungi.*

Hypnotism. See *Mesmerism.*

Hypnum (hip'num), one of the largest genera of mosses, including above ninety species, natives of Britain. Many of the species are very large and ornamental.

Hypocaust (hip'o-kąst), in ancient baths, etc., an arched chamber in which a fire was kindled for the purpose of giving heat to the rooms above it. The heat was distributed by means of tubes of earthenware.

Hypochlorites (hī-pu-klor'itz), salts, chiefly important as powerful oxidizing and bleaching agents; not, however, when pure, but when containing chlorides. The chief hypochlorites, or at least the complex substances which contain hypochlorites, are bleaching-powder, and the bleaching liquors made with potash and soda.

Hypochondria (hip-u-kon'dri-a), a disorder arising from a disturbance of the functions of the nervous system. It is a form of melancholia. The sufferer lives under the generally groundless apprehension of different diseases. Uninterruptedly occupied with the state of his body he takes notice of every feeling, and wishes to have every trifling pain explained, considering every one as a symptom of a serious disease.

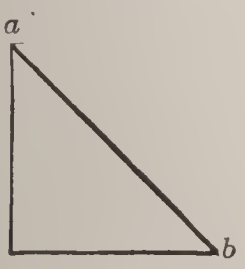
For everything he wants physic. Hypochondria is, physically considered, not a dangerous disease, although it makes the life of the sufferer a torment to himself and his friends. It is occasioned mainly by too great mental exertion, by too sedentary a life, by sexual indulgence or excess in exciting liquors; and also by want of exercise of the physical and mental powers producing ennui. It can be cured, but slowly, by the avoidance of the habits likely to occasion it, by the adoption of a steady and regular life, with moderate exercise for the mind and body, and by the frequent enjoyment of cheerful society.

Hypodermic Injections (hī-pu-dė r'-mik), injections of some substance beneath the skin; a method adopted in medicine when the condition of the stomach or other organs renders the use of drugs by the mouth objectionable, or when rapidity of action is desired. The medicine is introduced by a small glass or metal syringe fitted with a long hollow, needle-shaped point of steel, which is thrust through the skin.

Hypophosphites (hī-pu-fos'fīts), salts of hypophosphorous acid, especially certain medicinal salts, chiefly the hypophosphites of potassium, sodium and calcium. They have been used with considerable advantage in disorders of the blood and the digestive organs, and have also been found of benefit in consumption, although failing to effect a cure.

Hyposulphites (hī-pu-sul'fīts), salts of hyposulphurous acid. Among the most important are the hyposulphites of sodium and calcium, the former of which is used in medicine as an external remedy in parasitic skin disorders and an internal one in checking fermentation in zymotic diseases. It is variously used in bleaching, photography, and other arts as an antichlore, a dissolvent of bromide and iodide of silver, etc.

Hypotenuse (hī-pot'e-nūs) in geometry, the longest side in a right angled triangle, namely that one which subtends or is opposite to the right angle. One of the most important propositions of Euclid's *Elements* is the forty-seventh of the first book, discovered by Pythagoras, which proves that the square described on the hypotenuse is equal to the sum of the squares described on the other two sides.



a b, Hypotenuse.

Hypothecation (hī-poth-e-kā'shun), the act of assigning something in security without giving up the possession of it. See *Bottomry.*

Hypothesis (hī-poth'e-sis), etymologically a supposition; is popularly used to denote something not proved, but assumed for the sake of argument. In scientific and philosophical usage it denotes either a probable theory of phenomena not yet fully explained, or a strictly scientific theory which accounts for all the known facts of the case, and which only needs the verification of subsequent observations and deductions to become a certainty. Thus the conjecture of Newton that the force of gravity, as exemplified on the earth, might extend to the moon, was in its first stage a probable hypothesis; but when it was found to account for all the facts, it became a scientific hypothesis or theory. The word theory is frequently used where hypothesis should be employed.

Hypsiprymnus. See *Kangaroo-rat.*

Hypsometry (hip-som'e-tri), the measurement of heights. See *Heights.*

Hyracotherium (hī-ra-ku-ther'i-um), a genus of fossil Pachydermata, belonging to the odd-toed division, intermediate between the hog and the hyrax, occurring in the tertiary strata of England. The species are of the size of a hare.

Hyrax (hī'rakz), a genus of pachydermatous mammalia, intermediate in their character between the rhinoceros and the tapir. It is the only genus of the order Hyracoidea, characterized by having no canine teeth, but long, curved incisors. The front feet have four toes, and the hind feet three. The Cape hyrax is by the colonists of South Africa called *Rock-badger* and *Rock-rabbit.*

Hyrcania (hėr-kā'ni-a), a province of ancient Asia, corresponding to what are now the northern parts of Khorasan and Mazanderan, along the Caspian Sea.

Hyrcanus (her-kā'nus), the name of two Jewish high-priests and rulers of the Asmonean family; —John Hyrcanus, the son and successor of Simon Maccabæus, assumed the title of prince and the high priest in 137 B.C., freed Judæa from the yoke of the Syrians, and founded a dynasty of rulers which lasted till the accession of Herod. He also subjugated the Samaritans and Idumæans. He died in 105 B.C., leaving five sons, two of whom, Aristobulus and Alexander, afterwards governed with the

title of kings.—JOHN HYRCANUS II, grandson of the former, was appointed king in Jerusalem, but was forced by his brother Aristobulus to retire into private life. Pompey, however, appointed him high priest in B.C. 63. About 40 B.C. he was taken prisoner by the Parthians and carried with them to Seleucia. Here he remained till he was invited to Jerusalem by Herod, son of Antipater. Being suspected of plotting against Herod, he was put to death in B.C. 30.

Hyssop (his'up; *Hyssōpus*), a genus of plants of the nat. order Labiatæ. The common hyssop (*Hyssōpus officinālis*) is a perennial shrubby plant rising to the height of 2 feet, a native of Siberia and the mountainous parts of Austria, but common in our gardens. It flowers from June to September. The leaves have an agreeable aromatic odor, and a slightly bitter and somewhat warm taste. It was once esteemed as a medicine, but has now fallen into disuse. The hyssop of Scripture (the symbol of spiritual purification from sin) is generally identified with the caper (*Cappăris spinōsa*).

Hyssop (*H. officinālis*).

Hysteria (his-tē'ri-a), a nervous affection to which women are subject, generally occurring in paroxysms, characterized by alternate fits of laughing and crying, convulsive struggling alternately remitting and exacerbating, sense of suffocation, palpitation of the heart, the sensation of a ball ascending from the pit of the stomach, occasioning a feeling of strangulation (*globus hystericus*), etc. Women of a delicate habit, and whose nervous system is extremely sensitive, are the most subject to hysterical affections; and the habit which predisposes to these attacks is acquired by inactivity and a sedentary life, grief, anxiety and various physical disorders. They are readily excited, in those who are subject to them, by strong emotions, especially if sudden. Hysterical complaints are best prevented by a judicious care of the moral and physical education of girls. Men are sometimes, but rarely, subject to disorders not essentially different.

Hythe (hīth), a borough of England, one of the Cinque Ports, in the County of Kent, 11 miles w. s. w. of Dover, to the west of Folkestone, at the foot of a steep hill or cliff. It was anciently a place of great importance; but its harbor has been entirely silted up. It has become a fashionable resort for sea-bathing, and there is here a government school of musketry. A promenade over five miles along the coast was opened in 1881. Pop. (1911) 6387.

I

I, the ninth letter and the third vowel of the English alphabet, in which it represents not only several vowel sounds but also the consonantal sound of *y*. The two principal sounds represented by it in English are the short sound as in *pit*, *pin*, *fin*, and the long as in *pine*, *fine*, *wine*, the latter being really a diphthongal sound. It has also three other sounds, viz., that heard in *first*, *dirk* (ė, the neutral vowel); that heard in *machine*, *intrigue* (which, however, can scarcely be considered a modern English sound); and the consonant sound heard in many words when it precedes a vowel, as in *million*, *opinion*, *trunion*. I and J were formerly regarded as one character.

Iamblichus (ī-am′bli-kus), a Greek Neo-Platonic philosopher, a native of Chalcis in Cœle-Syria, who flourished in the beginning of the fourth century after Christ. He was the pupil of Porphyry, and having become perfect in the doctrines of the Plotinian school, he taught with vast reputation. His school produced many eclectic philosophers, who were dispersed throughout the Roman Empire. His philosophical works now extant are: a *Life of Pythagoras;* an *Exhortation to the Study of Philosophy; Three Books on Mathematical Learning;* a *Commentary upon Nicomachus' Institutes of Arithmetic;* and a *Treatise on the Mysteries of the Egyptians, Chaldeans, and Assyrians.* He died at Alexandria about 333.

Iambus (ī-am′bus), in prosody, a foot of two syllables, a short and long one (⏑ —), or an unaccented syllable followed by an accented one. The iambic meter is the fundamental rhythm of many English verses. The verse of five iambic feet is a favorite meter, being the heroic verse of English, German, and Italian poetry.

Ianthina (i-an′thi-na; Gr. *ianthinos*, violet-colored), a genus of oceanic gasteropodous mollusca, with a thin, violet-colored, snail-like shell. When irritated they pour out a violet secretion, which colors the surrounding water and serves for their concealment, in the same manner as the ink of the cuttle-fish.

Ibadan (ē-bä′dan), a town of Western Africa, in the Yoruba country, about 70 miles north of the Bight of Benin. Pop. said to be about 150,000, a few of them whites.

Ibague (ē-bȧ-gā′), a town of South America, Republic of Colombia, department of Tolima. Pop. 16,000.

Ibarra (ē-bär′rȧ), a town of Ecuador, in South America, capital of the province of Imbabura, at the foot of the volcano of the same name, 30 miles north of Quito. Pop. estimated at 5000.

Iberia (i-bē′ri-a), in ancient geography:—(1.) A fertile district in Asia, between the Euxine and Caspian Seas, which consisted of a plain surrounded by mountains, a part of modern Georgia. (2.) An ancient name of Spain, from its river, the *Ibėrus* (Ebro). The Iberi or Iberians, probably the most ancient European nation, formed the basis of the population of Italy, Gaul, Spain and Lusitania (Portugal). Their language still lives in the Basque Provinces. The Celts, who entered the country some time later, were intermingled with them, the conjoined people being called Celtiberians.

Iberian Peninsula (ī-bē′ri-an), the Spanish peninsula (Spain and Portugal). See *Iberia.*

Iberis (ī-bē′ris), a genus of cruciferous plants, of which several species are cultivated in our gardens under the name of *candytuft.*

Iberus. See *Ebro.*

Ibex (i′beks), a name of two or three species of goats. The horns of the male are flattened, have two longitudinal ridges at the sides, and are crossed by numerous transverse knots. The horns of the female are short, more erect, with three or four knots in front. The best-known varieties are the *Capra Ibex* of the Alps and Apennines, the steinbock of the Alps, and the *C. Pyrenaica*, the Pyrenean steinbock. Another

species, *C. ægagrus*, inhabits the lofty rocky peaks of Mount Caucasus.

Ibex (*Capra Ibex*).

Ibicui (ib'i-kwi), a river of Brazil, which rises in the Serra de Santa Anna, province of Rio Grande do Sul, and joins the Uruguay at Yapeyu after a course of 400 miles.

Ibigau (ib'i-gą; *Nyctibus grandis*), a very large goat-sucker inhabiting South America; sometimes called the *grand goat-sucker.*

Ibis (ī'bis), a genus of birds allied to the storks, the most remarkable species being the *Ibis religiōsa*, or sacred ibis (also called *Threskiornis religiōsa*). This is found throughout Africa. It is about the size of a common fowl, with head and neck bare, and white plumage, the primaries of the wings being tipped with black and the secondaries being bright black, glossed with green and violet. It was reared in the temples of ancient Egypt with a degree of respect bordering on adoration, and after death was preserved in a mummified condition. The cause of its being deemed sacred was no doubt because it appeared in Egypt with the rise of the Nile; but it is now rare in that country, living farther south. There are several other species, as the *I. falcinellus*, or glossy ibis, nearly two feet in length, which builds in Asia, but migrates also to Egypt, sometimes visiting England; the *I. rubra* of tropical America, remarkable for its scarlet plumage; the *I. alba*, or white ibis of Florida; the *I.* or *Geronticus spinicollis*, or straw-necked ibis of Australia, etc.

Ibn-Batuta (ib'n ba-tū'ta), an Arabic traveler, born at Tangiers 1304; died at Fez 1377. He visited Egypt, Syria, Arabia, Persia, Central Asia, India, China, the Eastern Archipelago, East Africa, Central Africa, etc., and wrote an account of his travels.

Ibn-Ezra. Same as *Aben-Ezra.*

Ibrahim (ib'ra-him), the Arabic form of *Abraham*, and the name of many sultans and grand-viziers distinguished in Ottoman history.

Ibrahim Pasha, an adopted son of Mehemet Ali, viceroy of Egypt, born in 1789. He first gave signal proofs of his courage and military talents in the war with the Wahabis of Arabia, whom he completely defeated, and in the subjugation of Sennaar and Darfur. In 1825 he invaded the Morea at the head of an Egyptian army, with the view of conquering Greece for his father; but in 1828, in consequence of the interference of the great powers, was obliged to abandon the attempt. To effect his father's purpose of making Syria a bulwark to his new Egypto-Cretan kingdom he, in 1831, crossed the Egyptian frontiers with an army, overran Palestine, took St. Jean d'Acre by storm and made himself master of all Syria. The campaign terminated by an arrangement in which the Porte ceded Syria, and conferred the pashalic of Adana, by a kind of lease, personally on Ibrahim. In no long time war with the sultan again broke out, and resulted in a great defeat of the Turkish forces at Nizib in 1839. By the interference of the great powers Ibrahim was eventually obliged, after retiring from all his Syrian conquests, to return to Egypt, marching across the desert from Damascus with great loss and suffering. From this time he appeared seldom in public life, and employed himself chiefly in the improvement of his own estates. In 1846 he visited England and France. In 1848 Ibrahim, after his father had become superannuated, proceeded to Constantinople, and was nominated Viceroy of Egypt, but he died in the same year at Cairo, while Mehemet Ali was still alive. He was succeeded by Abbas Pasha, the favorite grandson of Mehemet Ali.

Ibrail. See *Braïla.*

Ibsen (ib'sen), Henrik, a Norwegian dramatist and lyric poet, born in 1828. His first play, *Catilina*, was produced in Christiania in 1850. This was an ill-written production, but his *Warriors in Helgeland* (1850), and *Rival Kings* (1864), raised him to the first rank among the national dramatists of Scandinavia, and *Love's Comedy* (1862) was the first step towards his satirical social dramas. He was successively director of the theater at Bergen and of the Norske Theatre at Christiania which he managed in 1857-62. In 1864

he left his native country and thereafter resided chiefly abroad. His dramas are partly in prose, partly in verse, and include historical plays and satirical comedies of modern life. Some of them have been rendered on the English and American stage and are very highly regarded as literary and dramatic productions. The first to attract world-wide attention was *A Doll's House* (1879). This was followed by *Ghosts*, *The Wild Duck*, *The Master Builder*, and others, psychological in their interest, but vividly realistic in language, some of them giving rise to a storm of controversy. Ibsen was also a lyric poet. He obtained a pension from the Storthing. He died in 1906.

Ibycus (ib'i-kus), a Greek lyric poet born at Rhegium, Italy, in the sixth century B.C.; lived mostly at Samos in the court of Polycrates. It is related that while on a journey he was surprised and murdered by robbers near Corinth. Finding escape impossible, he declared that the cranes which happened to be flying over their heads would avenge his death. The robbers afterwards seeing a flock of cranes, one of them said involuntarily, 'Behold the avengers of Ibycus.' They were in consequence seized, and, after confessing their crime, were executed. His writings are known only by fragments. His poetry was chiefly erotic, but sometimes mythical and heroic.

Ica (ē'ka), a coast department of Peru, area, about 8700 sq. miles; pop. 100,000.—Its capital, Ica, lies in the fruitful valley of the river Ica; pop. 9000.

Icarus (ik'a-rus). See *Dædalus*.

Ice (īs), water frozen into a solid mass. Water freezes when its temperature is reduced below a certain point, which is by universal consent made a fixed point on thermometers. That point is called zero on the Centigrade and Réaumur scales, and 32° on the Fahrenheit scale. Water near the freezing point presents the curious anomaly of expanding instead of contracting, as the cooling process goes on. At 4.1° Centigrade (39.4° Fahr.) water has its maximum density-point. At temperatures below 4.1° the volume of the water increases as the temperature falls, and decreases as the temperature rises; and at the moment of solidifying the volume of the mass suddenly increases to a very considerable extent, so that ice at the temperature of freezing is one-ninth greater in volume than the water from which it is formed is at 4.1°. It is on this account that water freezes at the top first, and that ice when frozen floats at the top of the water. The temperature at which pure water becomes ice is very nearly constant under ordinary circumstances; and it is this fact, along with the ease of procuring water at the freezing temperature, or rather ice at the point of liquefaction, that has caused the temperature to be adopted as one of the fixed points in thermometers. The freezing-point is, however, slightly influenced by pressure. Increase of pressure lowers it, and the removal of pressure raises it. Salt water requires a lower temperature to freeze it than fresh water, and in the process a large part of the salt is rejected. Hence water obtained from the melting of sea-ice is nearly fresh. If water is kept perfectly at rest it may be reduced in temperature far below the freezing-point without turning into ice; but particles of solid matter such as dust must also be kept from falling into it. The expansion of water on its conversion into ice often gives rise to the exhibition of very great force, and produces very remarkable effects in nature. Much of the disintegration observed in rocks and stones during or immediately after frost is due to it, water having entered into their pores and cavities and burst off particles by its expansion. Ice, though it is very hard and brittle, possesses the property of plasticity to a very remarkable degree, and can be moulded into any form by the application of pressure. The plasticity of ice is a property of very great importance. It was discovered by Forbes, who explained the motion of glaciers on it. (*See Glaciers.*) In nature ice appears in the greatest masses in the form of glaciers and icebergs, the latter being portions which have become detached from glaciers that extend down into the sea. Ice is now an article of considerable importance from a commercial point of view, large quantities of it being shipped to warm climates from countries where it is naturally produced in abundance in winter, as the United States or Norway. Ice can now be made cheaply by certain processes and apparatus (see *Refrigerating Machines*), and a very pure and excellent article is thus produced, and has to a considerable extent replaced natural ice for domestic and other use.

Icebergs (īs'bergz), large masses of ice which have become detached from the shores of the arctic regions, and float about in the ocean at the mercy of the winds and currents. They are in fact pieces of glaciers detached from the parent mass by the action of the sea and by their own accumulating

weight. They present the strangest and most picturesque forms, are sometimes miles in length, and rise to a height of perhaps 250 or 300 feet above the sea, the portion above water being calculated at about an eighth of the whole. Icebergs consist of clear, compact solid ice, with a bluish-green tint. Their cavities contain fresh water, from the melting of the ice. They are frequently encountered in the North Atlantic (of course in the southern seas as well), and have caused many a wreck. The ice that forms on the surface of the sea, called *field-ice*, is porous, incompact, and imperfectly transparent. The field-ice forms in winter and breaks up in summer. A small field is called a *floe;* one much broken up forms a *paek.*

Iceboat, ICE YACHT, a triangular wooden framework with broad end forward, mounted on three skates or runners, 3 feet long by 8 inches deep. The motive power is a large sail, fastened to a boom and yard, which may be over 30 feet long. Such boats, running on smooth ice before the wind, may attain an average speed of 30 or 40 miles an hour and sometimes reach over 60 miles. The Hudson River is a favorite field for this sport.

Ice Breaker, a powerful boat or ship, used to break the ice in rivers or harbors. All our large northern rivers use such boats to keep the channel open in the winter. The Great Lakes are kept open for navigation by this means. An ice-breaking boat employed on Mackinaw Strait has large screws at bow and stern, and breaks the ice by forcing the water up under pack-ice and throwing it up on both sides. Russia employs in the Gulf of Finland a powerful ice-breaking ship, the *Ernick*, which forces the water upward by aid of a screw, lifting and breaking the ice, which is then cast aside by the strong steel bow, leaving a broad open channel for other ships to follow.

Iceland (īs'land), an island belonging to Denmark, situated between the North Atlantic and the Arctic Oceans, 250 miles from Greenland and about 600 miles west of Norway; greatest length, east to west, 300 miles; central breadth, about 200 miles; area with adjacent isles, 40,437 sq. miles. In shape it somewhat resembles a heart with its narrowest point turned south. The coast-line for a considerable extent on the southeast is almost unbroken, but in all other directions presents a continued succession of deep bays or fiords and jutting promontories, thus affording a number of natural harbors. The interior has generally a very wild and desolate appearance, being covered by lofty mountain masses of volcanic origin, many of them crowned with perpetual snow and ice, which, stretching down their sides into the intervening valleys, form immense glaciers. These icy mountains, which take the common name of Jökul, have their culminating point in Oräfajökul, which is situated near the southeast coast, and has a height of 6409 feet. Among the volcanoes the most celebrated is Mount Hecla, in the south, about 5000 feet high. Numerous hot springs or *geysers* are scattered throughout the island, but are found more especially in the southwest, to the northeast of Reikjavik. (See *Geysers.*) There are numerous lakes and rivers. The most valuable mineral product is sulphur, of which the supply appears to be inexhaustible; the other minerals deserving of notice are chalcedonies, rock-crystals, and the well-known double-refracting spar, for which the island has long been famous. There is a kind of brown coal which to some extent serves as fuel. The climate is mild for the latitude, but the summer is too cool and damp for agriculture to be carried on with much success. In the southern parts the longest day is twenty hours, and the shortest four, but in the most northern extremity the sun at midsummer continues above the horizon a whole week, and of course during a corresponding period in winter never rises. Vegetation is confined within narrow limits. Almost the only tree is the birch, which has a very stunted growth, the loftiest of them hardly exceeding 10 feet. There are various flowering plants, among which saxifrages, sedums, thrift or sea-pink, etc., are common. Heath and bilberry cover large stretches. Among mosses or lichens are the edible Iceland-moss (which see). Cole, potatoes, turnips, radishes, and similar roots thrive tolerably well. But by far the most valuable crop is grass, on which considerable numbers of live stock (sheep, cattle, ponies) are fed. The reindeer, though not introduced before 1770, has multiplied greatly and forms large herds in the interior; but they are of little importance economically. Wild-fowl, including the eider-duck whose down forms an important article of commerce, are abundant; the streams are well supplied with salmon, and on the coasts valuable fisheries of cod and herring are carried on. Manufactures are entirely domestic, and consist chiefly of coarse woolens, mittens, stockings, etc. The exports are wool, oil, fish, horses, feathers, worsted stockings and mittens, sulphur, and Iceland moss.

The inhabitants are of Scandinavian origin, and speak a Scandinavian dialect which still represents the old Norse or Norwegian in great purity. They are of Protestant religion. Iceland has a constitution and administration of its own, dating from 1874. There is an *Althing* or Parliament, which meets twice a year at Reikjavik, the capital, and consists of 36 members, of whom 30 are chosen by popular suffrage, and 6 nominated by the king. A minister for Iceland, nominated by the king, is at the head of the administration, but the highest local authority is vested in the governor.

Some of the settlements of Irish monks had been made in Iceland about the end of the eighth century, but the island received the greatest proportion of its population from Norway. In 870 Harald Haarfager had made himself supreme in Norway, and as he treated the landed proprietors oppressively, numbers left the country and went to Iceland. In the course of sixty years all the habitable parts of the coast were settled. A settled government was established, a sort of aristocratic republic, which lasted for several centuries. Christianity was introduced in 981, and adopted by law in 1000; and schools and two bishoprics, those of Holar and Skalholt, were established. The Latin language and the literature and learning of the West, introduced by Christianity, were all the more warmly received, because poetry and history had already been cultivated here more than elsewhere in the Germanic north. Previously to this time the Icelanders had discovered Greenland (983) and part of America (about 1000), and they were now led to make voyages and travels to Europe and the East. Politically and ecclesiastically the most flourishing period of Iceland—the period, too, when its intercourse with the world abroad was most active—was from the middle of the twelfth to the beginning of the thirteenth century. In 1264 Magnus VI of Norway united Iceland with his own kingdom, with which it passed to Denmark in 1380, remaining with the latter in 1814, when Norway was joined to Sweden.

The Icelandic language is the oldest of the Scandinavian group of tongues, and as it is believed to exhibit the Norse language nearly as it was spoken at the date of the colonization of Iceland, it is sometimes called *Old Norse*. It is rich in roots and grammatical forms, and soft and sonorous to the ear. Icelandic literature may be divided into an ancient period, extending to the fall of the republic, and a modern, extending from that date to the present time, the former being far the richest and most original. Poetry was early cultivated, and among the most important works in Icelandic literature is the collection of ancient heathen songs called the elder or poetic Edda. (See *Edda.*) Histories and romantic works, known by the name of Sagas, are numerous. Many of these are masterpieces of prose style, and are still read with delight by the people of Iceland. The early portion of the second period was barren of anything worth mention in the way of literature, nor can the modern period boast at all of works possessing the interest of those belonging to the ancient, though since the middle of the eighteenth century there is scarcely a department of literature in which Icelandic writers have not done something. Many of the most valuable foreign works have been translated into Icelandic, and even the poems of Milton are read at many a cottage fireside. Pop. 78,489.

Iceland Moss, *Cetrāria islandĭca*, a species of lichen found in the Arctic regions, and on the upper parts of lofty mountains, as for instance in Scotland. It is used in medicine as a mucilaginous bitter, and in Iceland is collected as a nutritious article of diet. When boiled with milk or water it forms a jelly. Its bitterness may be removed by steeping.

Iceland Moss (*Cetraria islandica*).

Iceland Spar, the transparent variety of calcspar, a mineral noted for its property of exhibiting in a remarkable degree the double refraction of light.

Iceni (i-sē′ni), a warlike tribe of ancient Britain, occupying the modern counties of Suffolk, Norfolk, Cambridge, and Huntingdon. They fought against the Romans under their queen Boadicea.

Ice-plant (*Mesembryanthĕmum crystallĭnum*), a plant (order Mesembryaceæ) which has received the above appellation from the transparent vesicles which cover its whole surface, and have the appearance of granules of ice. It is a native of South Africa and the Canaries, and is also found in Greece.

Ich Dien (ēh dēn; German, 'I serve'), motto of the Prince of Wales, assumed from that of the King of Bohemia, slain at the battle

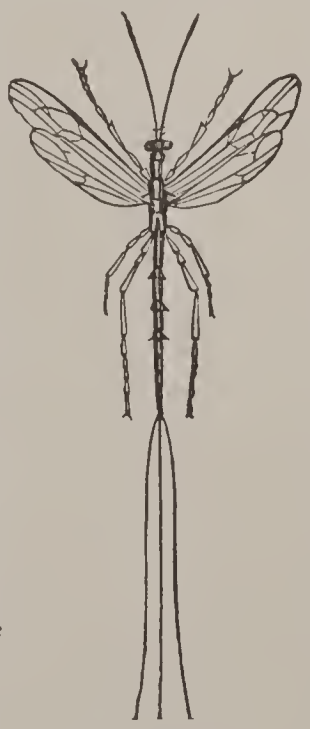
of Crècy, at which he served as a volunteer in the French army.

Ichneumon (ik-nū′mun; *Herpestes*), a genus of digitigrade carnivorous animals belonging to the civet family. They have a long slender body, a sharp and pointed muzzle, and short legs. The most celebrated species,

Egyptian Ichneumon (*Herpestes Ichneumon*).

Herpestes Ichneumon, inhabits Egypt, where it is called *Pharaoh's rat*. It was adored by the ancient Egyptians on account of its antipathy to crocodiles, whose eggs it digs out of the sand and sucks. It is expert in seizing serpents by the neck so as to avoid any injury to itself. It is domesticated in Egypt, and more useful than a cat in destroying rats and mice. Their disadvantage, as domestic animals, is their predilection for poultry. The mongoose, or Indian ichneumon, is another species, not so large as the Egyptian, which it resembles in habits, being kept in many families as a useful domestic animal. It was introduced into Jamaica to kill the rats that infested the sugar plantations. This it effected, but has since become a nuisance from its ravages among the poultry of the island.

Ichneumon-flies, a large family of hymenopterous insects, which all agree in one particular, that they deposit their eggs either in or on the bodies, eggs, or larvæ of other insects. These apparently insignificant creatures confer inestimable benefits on man, as they destroy hosts of insects injurious to crops.



Ichneumon-fly (*Rhyssa persuasoria*).

Ichnology (ik-nol′-ō-ji), the name applied to the modern science of fossil footprints, or other impressions on rocks. The impressions are almost always found on rocks that have been deposited as mud; they are not so common in sandstone, yet they abound in the New Red Sandstone strata.

Ichor (ik′or). In Greek mythology this word indicates the ethereal fluid which takes the place of blood in the veins of the gods. The word is used in medicine to indicate the thin watery discharge from a wound.

Ichthyolite (ik′thi-u-līt), a petrified fish, or a stone with the impression of a fish.

Ichthyology (ik′thi-ol′ō-ji), that branch of zoölogy which treats of fishes. Fishes form the lowest of the five classes into which the great sub-kingdom Vertebrata is divided. They may be shortly described as vertebrate animals living in water and respiring the air therein contained by means of gills or branchiæ, having cold red blood, and a heart consisting of one auricle and one ventricle; and having those organs which take the form of limbs in the higher vertebrata represented by fins. Their bodies are generally covered with scales overlapping each other, and their usual form (though with much diversity) is lengthened, compressed laterally, and tapering toward both extremities. The scales of fishes assume various forms, which have been classed under the four types of *cycloid*, *ctenoid*, *ganoid*, and *placoid*. Cycloid scales are of a rounded form, and are those met with in the most familiar fishes. Ctenoid scales, like those of the perch, have spinous projections from their posterior margin. Ganoid scales are in the form of thick bony plates covered with a superficial layer of enamel. Placoid scales form detached masses of various shapes often provided with spines. The skeleton presents great variations, from the amphioxus, in which the vertebræ are only foreshadowed, to the well-ossified skeleton of teleostean fishes. The vertebræ are biconcave or 'amphicœlous,' the opposed surfaces forming cups, and they vary in number from seventeen to more than 200. The spinal column is prolonged into the tail, which is two-lobed, the lobes either being equal (a *homocercal* tail) or unequal (*heterocercal*). The skull varies greatly; it may be ossified throughout as in the codfish, or the cartilaginous cranium may persist, as in the lamprey, sharks, and rays. The skull is small compared to the size of the animals themselves. The limbs, when present, are four in number. The anterior or first pair are called the *pectoral fins*. The *ventral fins*, or second pair of limbs, are variable in position, and not always present; they may be beneath the pectorals,

when they are *jugular;* behind the pectorals, when they are *thoracic*; or farther back, *abdominal.* The pelvis is represented by two triangular bones, which have no relation to the spinal column, and to which the fin-rays are directly attached. The median or vertical fins, that is, those situated on the back, are characteristic of fishes, and they may extend nearly from the head continuously to the anal aperture, as in eels; they may be broken up into several dorsals, caudal, and one or more anals, as in the cod; or the number of dorsals may be increased greatly, as in the mackerel. The fins may be wholly soft and flexible, or they may be in part rigid spines; or a series of soft fin-rays may be preceded by rigid and often formidable spines, which sometimes have a beautiful mechanism for elevation and depression. The teeth of fishes are generally very numerous, and may be placed on any part of the interior of the mouth, sometimes on the tongue. They are quite different in character from the mammalian teeth. The muscular pharynx and œsophagus lead into a stomach usually well defined, but sometimes only slightly differing in calibre from the intestine. The liver is proportionally large, and has usually a gall-bladder. The heart consists of a single auricle and ventricle, which is continued forwards by a dilated vessel called the *arterial bulb* (*bulbus arteriosus*). From this vessel the blood is sent right and left along the gills, which are the organs of respiration, and from the gills the aerated blood goes to the body. The gills or *branchiæ* are either free on one margin, as in ordinary fishes, or attached at both extremities. In the lepidosiren another structure appears, namely, lungs, which stretch through great part of the body and open on the posterior wall of the pharynx. A peculiar feature of fishes is the air-sac or swim-bladder, called also the *sound.* Anatomically its origin is identical with that of a lung; but it does not perform the function of a lung. It most probably represents an ancient lung-like organ which has degenerated, losing its original functions and assuming others. Its chief function at present is to serve as an aid in rising and sinking; but in some fishes it is prolonged so as to approach or even come in contact with the internal organs of hearing, perhaps acting as an organ of resonance. Reproduction is by ova or eggs, which in a few cases are retained in the body of the female until hatched. But the ova are usually fertilized outside the body, and the hatching process left to take place without aid. The eggs are, in most cases, in enormous numbers, as in the roe of the herring and salmon. Among the sharks the number is much less, and each ovum acquires, before exclusion, a horny sheath of various shape, but usually provided with cirri, by which it moors itself to some fixed object. In the pipe-fishes the male has a marsupium or pouch formed by folds of the abdominal integument, and in this pouch the eggs, transferred thither on exclusion, are hatched. The nervous system of fishes presents considerable variety. The amphioxus has no enlargement of the nervous trunk comparable to a brain; but in all the others the division into fore, mid, and hind brain is clearly marked. The olfactory organs are, in most cases, pits or sacs, on whose walls the olfactory filaments are spread out. The sense of taste seems less provided for, the tongue and palate being mostly firm, and often set with teeth. There is no external ear, and the internal apparatus is not wholly inclosed in bone, as in the higher vertebrates, but is partly free in the cavity of the skull. The eye is, in most cases, relatively large and flattened externally, the sight being keen. Special organs of touch are wanting for the most part, though the labial filaments, seen in the cod, whiting, mullet, and sturgeon, are of this nature. Among the most curious appliances with which fishes are provided, are the electrical apparatus that appear in some species, as in the torpedo or electric ray and the electric eel, both of which possess batteries capable of giving a shock of considerable power. Some fishes inhabit exclusively either fresh or salt water; others, as the salmon, migrate periodically from the one to the other.

Fishes may be roughly divided into two sections—the Chondropterygious or Cartilaginous fishes, having a cartilaginous or fibro-cartilaginous skeleton; and the Osseous or Bony fishes, having a bony skeleton. These two great divisions formed the basis of the classification of Cuvier. Agassiz proposed to divide fishes into four orders according to the character of their scales, viz., Ganoid, Placoid, Cycloid, Ctenoid, but this division has not been accepted.

The following divisions are now usually recognized:—

Order I.—Teleostei. Osseous or Bony Fishes, corresponding nearly to the Osseous fishes of Cuvier's classification. Characters: Skeleton more or less thoroughly ossified; two pairs of limbs usually present in the form of fins; gills free, comb-like, or tufted; usually cycloid or ctenoid scales. Sub-order I.—*Malacopteri.* Fishes with a complete set of fins supported by rays, all of which are soft,

as a rule. Examples: herring, pike, carp, salmon, eel, etc. Sub-order II.—*Anacanthini.* Fishes with fins entirely supported by soft rays; ventral fins wanting, or if present placed under the throat beneath or in advance of the pectoral fins. Examples: cod, haddock, ling, sole, turbot, and other flat-fishes. Sub-order III.—*Acanthopteri.* Fishes having one or more of the first rays of the fins in the form of spines; scales usually ctenoid; ventral fins beneath or in front of the pectorals. Examples: perch, gurnard, mackerel, mullet, etc. Sub-order IV.—*Plectognathi.* Body covered with ganoid plates, scales, or spines; ventral fins generally wanting. Examples: globe-fish, sun-fish, trigger-fish. Sub-order V.—*Lophobranchii.* Gills in the form of little tufts upon the branchial arches; scales ganoid. Examples: hippocampus, or sea-horse.

Order II.—Elasmobranchii. Characters: Skeleton cartilaginous; no bones in the head, the skull forming a cartilaginous box; gills forming a series of pouches; two pair of fins supported by cartilaginous fin-rays; skin covered by placoid growths of various kinds, as tubercles, spines, etc. Sub-order I.—*Holocephali.* Jaws bony and covered with broad plates representing the teeth; only one external gill-aperture, covered with a gill-cover. The chimæra or king of the herrings is an example. Sub-order II.— *Plagiostomi.* Mouth transverse (Gr. *plagios*, athwart) and on the under surface of the head; branchial sacs opening by several distinct apertures. Examples: sharks, rays, skate.

Order III.—Ganoidei. Characters: Body covered with ganoid plates, scales, or spines; skeleton partially ossified, the vertebral column being generally cartilaginous; skull with distinct cranial bones; usually two pairs of fins, the first rays of which are mostly in the form of spines; tail generally heterocercal. There are few living ganoid fishes, the great majority of them being found fossil. The best-known examples are the sturgeons.

Order IV.—Marsipobranchii. Characters: General form eel-like or serpentine; no paired fins to represent the limbs; only a median fin extending round the posterior extremity of the body; mouth circular and destitute of jaws proper; gills in the form of fixed pouches or sacs. Examples: lampreys and hag-fishes.

Order V.—Pharyngobranchii. The lancelet, the only example. Characters: No skull or distinct brain; no distinct heart; no vertebræ; no limbs; mouth a longitudinal fissure surrounded by filaments; walls of the pharnyx perforated by ciliated slits which serve as branchiæ.

Order VI.—Dipnoi. Represented by only a few fishes, as the mud-fish or lepidosiren and ceratodus. Characters: Body somewhat eel-like in form and covered with scales; pectoral and ventral limbs both present and filiform or sometimes paddle-shaped; both gills and lungs present. These animals form a connecting link between the fishes and the amphibia.

Ichthyopsida (ik-thi-op′si-da; Greek, *ichthys*, a fish, and *opsis*, appearance), one of the three great primary divisions of the Vertebrata (the others being Sauropsida and Mammalia), comprising the fishes and amphibia.

Ichthyornis (ik-thi-or′nis; Greek, *ichthys*, a fish, *ornis*, a bird), a fossil genus of carnivorous and probably aquatic birds, one of the earliest known American forms. It is so named from the character of the vertebræ, which, even in the cervical region, have their

Fig. 1, *Ichthyornis dispar*, restored. Fig. 2, Right jaw, inner view; half natural size.

articular faces biconcave as in fishes. It is also characterized by having teeth set in distinct sockets. Its wings were well developed, and the scapular arch and bones of the legs conformed closely to the true bird type.

Ichthyosaurus (ik-thi-u-sa′rus; Greek, *ichthys*, a fish, *sauros*, a lizard), an immense fossil marine saurian or reptile, having an organization combining the characters of saurian reptiles and of fishes with some of the peculiarities of the whales. The members of this genus had four broad feet or paddles enclosed in a single sheath of integument, and a long and powerful tail. Some of the largest of these reptiles must have exceeded 30 feet in length. Their remains range from the Lower Lias to the Chalk, and the great repository hitherto has been the Lias at Lynn Regis.

Ichthyosis (ik-thi-ō′sis), or Fish-skin Disease, a roughness and thickening of the skin, portions

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Scale of Miles
0 10 20 40 60

Size of type indicates relative Importance of places.

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of which become hard and scaly, and occasionally corneous, with a tendency to excrescences. This disease seldom yields permanently to any plan of treatment yet known.

Icica (ī′si-ka), a genus of plants, nat. order Amyridaceæ, mostly large trees, natives of South America. *I. altissima*, the cedar-wood of Guiana, is a useful timber. All of these trees yield a transparent fluid resembling turpentine in many of its properties, and sometimes named *icica*, also *elemi* or *copal*.

Icolmkill (ī-kō′ni-um). See *Konia*.

Iconium (ī-kō′ni-um). See *Konieh*.

Iconoclasts (ī-kon′o-klastz), image-breakers, the party in the early Christian Church that would not tolerate images, much less the veneration of them. At first images of martyrs and bishops were placed in the churches merely to keep their memory fresh, but in the sixth century they began to be worshiped, lights being burned before them and incense offered in their honor. The eastern emperor Leo III issued an edict in 726 ordering the people to abstain from the worship of such images, and soon after he decreed their destruction. This caused great commotion, and there arose two parties in the church, the image-worshipers and the *Iconoclasts* or image-breakers, who each in turn persecuted the other. In 754 a council at Constantinople condemned image worship; in 787 the second council of Nice (Nicæa) asserted and defined the doctrine. The controversy lasted over a century, coming to an end when, under the Empress Theodora, a council held at Constantinople (842) declared in favor of the worship of images among the Greeks, a decision which was confirmed by a second council, held 869-870, in the same place. In the Western Empire also images were at first retained only to preserve the memory of pious men, but the decision of the pope, which allowed the veneration of images, finally prevailed in the Western Church. See *Iconolatry*.

Iconographic (ī-kon-o-graf′ik), written in pictures; applied to books profusely illustrated.

Iconolatry (ī-kon-ol′a-tri), the worship or adoration of the images of sacred personages connected with the Christian religion, as images intended to represent angels, the Virgin Mary, saints, martyrs, etc. Iconolatry must not be confounded with idolatry, which worships objects as being themselves divine or possessing supernatural power. The worship or adoration of images was not common in the church for several centuries after Christ, and in its earlier stages it excited strong feelings, especially in the Eastern section of the church. (See *Iconoclasts*.) The second council of Nicæa taught that images were to be retained, but that they were not to be objects of adoration in the strict sense, though it was right to salute, honor, and venerate them, and to burn lights and incense before them. This decree was rejected by Charlemagne and by a council at Frankfort in 794, but the practice of image worship finally established itself in the West. Roman Catholics maintain that the cultus of images is 'relative,' and that they are not in themselves really adored or honored, 'but that all worship and veneration is referred to the prototypes.'

Icteridæ (ik-tėr′i-dē), a family of American passerine birds, allied to the starlings, remarkable for the hammock-like nests which they construct, and hence called *hangnests*. The Baltimore oriole may be regarded as typical.

Ictinus (ik-tī′nus), an ancient Greek architect of whom little is known except that he was the chief architect of the Parthenon of Athens, 438 B.C.

Icy Cape, a cape of Alaska, in the Arctic Ocean, lat. 71° N., lon. 161° W.

Ida (ī′da), in ancient geography:—(1) A mountain range in the Troad (Mysia), at the foot of which lay the city of Troy. Its highest peak was Gargarus, about 4650 feet. (2) The middle and highest summit of the mountain chain which divides the island of Crete from east to west. This peak affords a fine prospect, and is covered with woods of pine, maple and cedar, but is not fertile.

Idaho (ī′da-hō), one of the United States. It lies on the western slope of the Rocky Mountains, having Montana and Wyoming on the east, and Washington and Oregon on the west, Utah and Nevada on the south, and British America on the north; area, 83,888 square miles. It owes its rise and importance to its rich gold fields, previous to the discovery of which, in 1860 and subsequently, the territory was inhabited only by Indians. The State is largely mountainous, the summits rising to 12,000 and 13,000 feet. In the center are the Salmon River Mountains, to which belongs the picturesque and lofty Saw-tooth Range. Its chief rivers are the Lewis or Snake River and the Salmon River, the latter a tributary of the former, which again joins the Columbia. Along the course of the Snake River in the S. E. and

s. is a desert tract 400 miles long by 40 to 60 broad. There are valuable forests, but they extend over only a small area. The scenery along the Salmon River in some places is grand, the stream flowing between perpendicular walls of rock from 500 to 2000 feet high. The Snake River has three large and fine cataracts, one of which, the Shoshone Falls, rivals Niagara in magnificence when the water is high. Gold has been found in many places, and there are also valuable silver mines, gold and silver being produced to the value of over $5,000,000 annually. Coal, copper, iron, and salt are likewise found in many localities. The wild animals include the grizzly bear. The higher mountain ranges are bleak and barren, but the lower hills are generally well wooded, and the soil of the valleys is productive. In general the country is better adapted for grazing than for farming, but more than 8,000,000 acres are said to be capable of irrigation, and more than 700,000 acres are now artificially watered. Snake River is the most important stream for irrigating purposes in the south and west. Idaho Territory was formed in 1862, then including Montana and much of Wyoming. It was reduced to its present limits in 1868, and admitted as a State in 1890. Boisé City is the capital. Pop. 325,594.

Idalium (i-dā′li-um; now DALI), a promontory of the east coast of Cyprus on which was a celebrated temple of Venus; hence her surname *Idalia*.

Iddesleigh (id′des-lē), STAFFORD HENRY NORTHCOTE, FIRST EARL OF, an English statesman, born 1818; died 1886. He was educated at Balliol College, Oxford, where he gained the highest honors; became private secretary to Mr. Gladstone in 1843, and was called to the bar in 1847. In 1851 he succeeded his grandfather in the family baronetcy. He held various offices, and represented several constituencies in Parliament, being long member for North Devon. He published a treatise, *Twenty Years of Financial Policy*, in 1862. He was made special commissioner to America to arrange the *Alabama* difficulty. Subsequently he was secretary for India (1867-68) and chancellor of the exchequer (1874-80). Upon Mr. Disraeli's elevation to the peerage he became leader of the Lower House, his task being all the more difficult on account of the Parliamentary obstruction of the Irish Home Rule party. He was elected lord rector of Edinburgh University in 1883. Lord Salisbury having undertaken to form a government, he was created (1885) Earl of Iddesleigh, and became first lord of the treasury.

Ide (īd), a fish of the carp family (Cyprinidæ), the *Leuciscus idus*, found in rocky lakes of Northern Europe. It is a good table-fish, which might be introduced into American waters.

Idea (ī-dē′a), as a term in mental philosophy, has been used in various senses. Plato regarded ideas as the archetypes or original models of things, as existing from eternity and constituting the patterns according to which the Deity fashioned the various things of which we become cognizant by our senses. According to Plato, ideas are independent of matter, and it is they that are the only objects of true knowledge. Aristotle opposed Plato's doctrine of independent ideas, but held the doctrine of ideas being types or patterns accompanying material things. By Descartes and many modern philosophers the word is employed to signify all our mental representations, all the notions which the mind frames of things. See also *Idealism*.

Idealism (ī-dē′al-izm), the philosophical term which, in contradistinction to *realism*, expresses the view that subjective or ideal existence is not only the original but the only true being, and according to which there is allowed to sensible objects merely a phenomenal existence dependent upon the mind of a thinking subject. In modern times idealism has been maintained by Descartes, Berkeley, Kant, Fichte, Schelling, and Hegel. Some of these, as Descartes and Kant, are not, however, pure idealists, inasmuch as they allow at least a problematical existence to sensible things independent of the thinking subject. Berkeley is perhaps the most thorough-going idealist, holding that what is called matter consists merely of ideas, that is, appearances produced in the mind by the direct influence of the Deity. This dogmatic idealism of Berkeley differs from the critical or transcendental idealism of Kant. This consists in the doctrine that all the material of experience is given in sensation, but on the other hand the forms of the experience (space, time, and the categories of the understanding) arise in ourselves *a priori*, and that accordingly sensible objects are known only as they appear to us and not as they are in themselves. Fichte, on the other hand, rejected the notion of things in themselves as untenable and self-contradictory, and created the system of so-called subjective idealism, according to which the I or thinking subject produces the appearance of a sensible world by a mode of activity

grounded upon its essential nature. The theories of Schelling and Hegel are developments of the Fichtean doctrine.

Identity (ī-den'ti-ti) of person in point of law must often be proved in legal proceedings, as in proving a thief, etc. The usual proof is the oath of one who was cognizant of the facts at the time referred to. A common defence of persons accused of crime is that it is a case of mistaken identity, in which case the prisoner must usually prove an *alibi* —*i.e.*, that he was in some other place at the time specified.

Ides (īdz), Latin *Idus*, with the Romans, the 15th day of March, May, July, and October. In the other months the 13th was the ides. The *ides* of March, on account of Cæsar's assassination having taken place on that day, was an *ater dies* or black day, and the senate was not allowed to sit. See *Calendar*.

Idiocy (id'i-u-si). See *Idiot*.

Idiosyncrasy (id-i-u-sin'kra-si), a distinctive peculiarity of the mental or bodily constitution of any person, or that constitution or temperament which is peculiar to any person. The more marked idiosyncracies are found chiefly in persons of neurotic type.

Idiot (id'i-ut), a person who, from original defect, is almost destitute of intelligence, or in whom the intellect seems to be almost wholly wanting. In some cases the intellectual development is so low that there appears to be little more than a vegetative life. Others not quite so low in the intellectual scale recognize the persons with whom they live, are capable of being affected by certain emotions, understand a few questions, articulate a few words, and are able to take their own food, but are quite unable to do any kind of work. Those endowed with a little more intelligence may sometimes be employed in some kinds of labor which present no complicacy or difficulty, but they are incapable of performing any intricate calculation or going through any long train of reasoning. The brain of idiots is sometimes sufficiently regular in its conformation, although in the great majority of cases there is something abnormal. The forehead is often depressed, receding, and flattened; sometimes the back parts of the head are disproportionately large. The majority of idiots are of small stature and of weak constitution, rarely living beyond forty years. The causes of idiocy are not well known. It may be hereditary.

Idocrase (ī'do-krās), a mineral sometimes massive, and very often in shining prismatic crystals. Its primitive form is a four-sided prism with square bases. It is called also *Vesuvian* or *Pryamidal Garnet*, and differs from common garnet chiefly in form.

Idolatry (ī-dol'a-tri), the worship of an image, object or symbol as having in itself some divine or supernatural power, and being able in some way to respond to the worship paid to it, such images or objects being called *idols;* or the adoration of something merely natural as something supernatural and divine. Many have regarded idolatry as a declension from the one true God, and have seen in the various forms of heathen worship only more or less complete degradations of an original revelation. Others see in idolatry an innate searching after God, and regard it as the first stage of human development, the necessary beginning of a knowledge of God. Idolatry may assume various forms; it may consist in a worship of the powers of nature, or of the heavenly bodies, or in animal worship, or in the worship of images representing mere fanciful and imaginary deities, or in the still lower fetichism.

Idria (ē'dri-a), a town of Austria, in Carniola, 21 miles southwest of Laibach, celebrated for its mines of quicksilver, which, after those of Almaden in Spain, are the richest in Europe, and employ in mining and smelting about 1300 persons. Pop. 5772.

Idris (i'dris), a mythical figure in Welsh tradition, at once a giant, a prince, and an astronomer. His rock-hewn chair may be seen on the summit of Cader Idris, and the tradition tells that any Welsh bard who should pass the night in this chair would be found in the morning either dead, mad, or with supernatural poetic powers.

Idumea (id-u-mē'a). See *Edom*.

Idun, or IDUNA (e-dö'na), a goddess in the Scandinavian mythology, wife of Bragi, keeper of the apples of which the gods ate to keep themselves young.

Idyl (ī'dil; from Gr. *eidyllion*, a 'little image') is the name originally and still most usually applied to a short and highly finished descriptive poem, especially if it treats of pastoral subjects, though this last circumstance is not an essential character of the idyl. All that is necessary to constitute a poem of this class is that it presents to view a complete picture in small compass.

Ieisk, or YEISK (ya'isk), a seaport of Russia, on the Sea of Azov. It was laid out only in 1848, but has rapidly

increased, and now has nurseries, tanneries, tile-works, oil-mills, soap-works, etc., and a considerable trade. Pop. 35,446.

Iekaterinburg. See *Ekaterinburg.*

Ieletz, or YELETZ, (yē′letz), a town of Russia, gov. of Orel, at the confluence of the Ieletz and Lutchka. It has flourishing manufactures, and an extensive trade. Pop. 37,455.

Iesi, or JESI (yā′sē), a walled town of Italy, in the province of Ancona, 17 miles S. W. of Ancona. Pop. (commune) 23,208.

If (ēf), a small island near Marseilles, on which is the Château d'If, built by Francis I in 1529. It was later used as a state prison, Mirabeau and Philippe Egalité being among its occupants.

Iglau (ēg′lou), an old town of Austria, the largest in Moravia next to Brünn, on the Iglawa, 49 miles W. N. W. of Brünn. The staple manufacture is woolen cloth. Pop. 24,387.

Iglesias (e-glā′ze-äs), a walled town of Sardinia, in the province of Cagliari. In its vicinity are lead, zinc, and other mines. Pop. (commune) 20,874.

Iglesias (i-gle′sī-as), MIGUEL, statesman and soldier, was born at Cajamarka, Peru, in 1822. He became active in politics, was made minister of war, and aided in defending Lima against Chilean invasion in 1878. He was subsequently made President of Peru, and signed the treaty of peace with Chile in 1883. He lost his seat through an insurrection in 1886, and subsequently lived in Spain.

Igdrasil. See *Ygdrasil.*

Iglo (ēg′lō), a manufacturing and mining town of Northern Hungary, on the Hernad. Pop. 7500.

Ignatieff (ig-nä′te-ef), NICHOLAS PAULOVITCH, Russian soldier and diplomatist, born in St. Petersburg, in 1832. He served in the Crimean war, and was made a colonel in 1856. In 1858 he was sent on a special mission to Bokhara and Khiva, and afterwards as ambassador to Peking 1860. He was appointed minister at Constantinople, 1864, and was envoy extraordinary, 1867-78. He was conspicuous in the negotiations before and after the Russo-Turkish war, and was appointed minister of the interior, but was dismissed in 1882. He represented the party in favor of war, in opposition to Prince Gortschakoff. He was subsequently made governor-general of Irkutsk.

Ignatius (ig-nā′she-us). ST., Bishop of Antioch, one of the apostolic fathers, said to have been a disciple of the apostle John. His life and death are wrapped in fable. According to the most trustworthy tradition he was appointed Bishop of Antioch A.D. 69, and was thrown to wild beasts in the circus of Antioch by the command of Trajan, the date being given by some as A.D. 107, by others as A.D. 116. By the Greek Church his festival is celebrated on Dec. 20, by the Latin on Feb. 1. In the literature of the early Christian church Ignatius holds an important place as the reputed author of a number of epistles. These have come down to us in three forms. In the longest text they are 13 in number, but since the discovery of a shorter text containing only 7 the first has been universally recognized as in great part spurious, some of the letters entirely so, and others containing interpolations. But even in this shorter form their genuineness has been disputed by numerous scholars. Both of these texts are in Greek, but a still shorter text in the Syriac language, containing only three letters, exists. Some maintain that the Syriac text was the earliest, though not earlier than the middle of the second century. Others hold the genuineness of the shorter Greek text.

Ignatius, ST., Patriarch of Constantinople, son of the Emperor Michael I, was born about 798; died in 878. When his father was deposed he entered a monastery, assuming the name of Ignatius. In 846 he was raised to the patriarchate. He was opposed to the Iconoclasts, and his refusal to admit Bardas, brother of the Empress Theodora, as a communicant, on account of his reported immorality, led to his deposition in 857. The schism between the Greek and Roman Churches began while Photius, his successor, was in office, and has continued ever since. He was reinstated in 867, and at an ecumenical council assembled at Constantinople in 869 Photius and his party were condemned

Ignatius Beans, ST., the seeds of a large climbing shrub (*Ignatiana philippinica*, or *Strychnos Ignatii*) of the nat. order Loganiaceæ, nearly allied to that which produces nux vomica, inhabiting the Philippines, and cultivated in Cochin China. The seeds contain a larger percentage of strychnia than the nux-vomica plant. It was so called by the Jesuits in honor of their founder, Ignatius Loyola.

Ignatius Loyola. See *Loyola* and *Jesuits.*

Igneous Rocks (ig′ne-us), in geology, rocks which are seen to owe their special character or

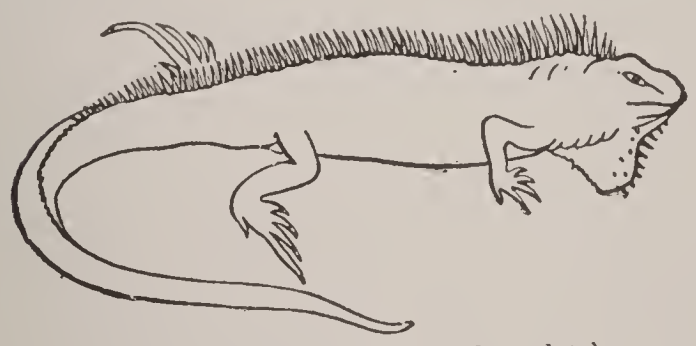
structure to their materials having been once in a state of fusion, as lava, basalt, granite, etc. Such rocks are not stratified, and may occur in connection with sedimentary rocks of any age, having usually been forced up from below.

Ignis Fatuus (ig'nis fat'ū-us; L. 'foolish fire'), a luminous appearance seen floating over marshy places at night, and sometimes, it is said, in churchyards. It is probably due to some gaseous mixture capable of igniting spontaneously, but it has never been satisfactorily explained, though methane is said to be the source. Also called *Will-o'-the-wisp, Jack-a-lantern.*

Ignorantines (ig-no-ran'tēns), a religious congregation of the Roman Catholic Church devoted to the gratuitous education of children. It was founded about 1683 by the Abbá de La Salle. The statutes of the order, approved by Benedict XIII in 1725, impose on its members vows of chastity, poverty, and obedience. In 1789 the order counted 1000 members, and possessed 121 houses. They were forced to quit France, but were recalled by Bonaparte in 1806. They are now to be met with in various countries. In France the law of 1882 banished them from the public schools.

Igualada (ē-gwá-lä'*dá*), a town in Spain, province of Barcelona, 36 miles W. N. W. of the town of Barcelona, on the Roya, with manufactures of cottons, woolens, etc. Pop. 10,442.

Iguana (i-gwa'na), a genus of lizards, the type of the family Iguanidæ, a native of Brazil, Guiana, and neighboring localities. It has an average length of about 4 feet. Its food consists almost entirely of fruits, fungi, and other vegetable substances. Its head is large, the mouth wide. Along the whole



Common Iguana (*Iguana tuberculata*).

length of the back to the tip of the tail there is a crest of elevated, compressed, pointed scales; the lower part of the head and neck is furnished with a dew-lap or throat-pouch. The toes are furnished with sharp claws, which enable it to climb trees with ease, while a rapid serpentine movement of its tail propels it swiftly through the water. Its usual color is dark olive-green. Its flesh is considered a delicacy, being tender and delicately-flavored, resembling that of a chicken. The eggs, of which the female lays from four to six dozen, are also eaten, having an excellent flavor. They are about the size of those of a pigeon, are laid in the sand, and hatched by the heat of the sun.

Iguanidæ (i-gwan'i-dē), a family of lizards of which the iguana is the type. They have the body rounded, sometimes laterally compressed and furnished with a ridge or serrated crest along the middle line of the back from snout to tip of tail, sometimes a throat-pouch or dew-lap present. See *Iguana.*

Iguanodon (i-gwan'u-don), an extinct fossil colossal lizard found in the Wealden strata; so called from the resemblance of its teeth to those of the iguana. The pelvic bones were strikingly like those of birds. The integument does not seem to have possessed the spines or bony plates of allied species. The anterior vertebræ were slightly amphicœlous, the posterior flat. The lower jaw was notched for the reception of the beak, as in the parrot. The teeth were large and broad, implanted in sockets, and transversely ridged. Mantell, its discoverer, estimated the length of the animal at from 60 to 70 feet, but Owen's calculation is 30 feet.

Ihlang-ihlang (ē'lang-ē'lang). See *Ilang-ilang.*

Ihre (ē're), JOHAN, a Swedish scholar, born in 1707; died in 1780. He became librarian at Upsala, where he obtained in 1737 the chair of literature and politics in the university. His most important work is called *Glossarium Suiogothicum* (a Swedish-Latin dictionary).

Ilang-ilang (ē'lang-ē'lang; *Cananga odorāta*), a large tree of the order Anonaceæ, cultivated in India and the Philippines, and yielding from its flowers a rich perfume.

Ilchester (il'ches-tėr), a decayed town of England, in Somersetshire, anciently an important Roman station, and furnishing numerous Roman remains.

Ildefonso, SAN (sän el-dā-fon'sō), a village of Spain, where is La Granja, a royal palace, built in a mountainous country by Philip V, in imitation of Versailles, 6 miles northeast of Segovia, 40 north by west of Madrid. The palace contains a great number of valuable paintings, statues, etc., and the gardens are magnificent.

Ile-de-France (ēl-dė-fräṇs), an old province of France,

having Paris as its capital, and now mostly comprised in the departments of Seine, Oise, and Seine-et-Oise.

Ileum (il'e-um), in anatomy, a name given to the lower three-fifths of the small intestine.

Ileus (il'e-us). See *Iliac Passion.*

Ilex (ī'leks), the genus to which the holly belongs; also a name for the evergreen oak or holm-oak. See *Holly* and *Holm-oak.*

Ilfracombe (il'frå-köm), a market-town in England, Devonshire, on the Bristol Channel, 41 miles N. W. Exeter; very picturesquely situated. There is an inner and an outer harbor, the former admitting ships of 300 tons, and an active trade in coal, cattle, and agricultural produce with Welsh and Irish points. Ilfracombe is much resorted to as a bathing-place and health resort. Pop. (1911) 8935.

Ili (ēl'yē), a river of Central Asia, partly in Chinese territory but mostly in Russian. It is formed in Chinese Kuldja by two streams, the Tekes and Kunges, rising in the Thian-shan Mountains, and flows westwards, falling into Lake Balkash by several mouths after a course of 800 or 900 miles, half of which is navigable.

Iliac Passion (il'i-ak), an ailment regarded by some as a distinct disease, though it is, in fact, the last stage of the severest forms of colic, and is often produced by mechanical obstruction. Acute pain, frequent vomiting, and hiccup are the chief symptoms. It is often fatal. Dilatation of the bowels by the bellows may produce good results; as a last resort, gastrotomy may be attended with success. The disease is also called *Ileus.*

Iliad (il'i-ad). See *Homer.*

Ilion (il'i-on), a village of Herkimer County, New York, on the Mohawk River and Erie Canal, 2 miles W. of Herkimer. It has a large armory for the manufacture of rifles and pistols, and other industries. Pop. 6588.

Ilion. See *Troy.*

Ilithyia (ī-lith-i-ī'a), among the Greeks the goddess who assisted women in childbirth. In after-times she was identified with Artemis (Diana).

Ilium. See *Troy.*

Ilkeston (il'kes-tun), a market-town of Derbyshire, England, 9 miles E. N. E. of Derby, situated on a lofty hill. The church is a fine ancient edifice. Manufactures of hosiery and lace are here carried on to a great extent, and a number of the inhabitants are employed in mining coal and ironstone. Pop. (1911) 31,673.

Ilkley (ilk'li), a village of Yorkshire, England, 31 miles west of York, beautifully situated on the Wharfe, and much resorted to by visitants to the hydropathic establishments. Near Ilkley is the fine old ruin of Bolton Priory. Pop. (1911) 7992.

Illampu (ēl-yàm-pö'). See *Sorata.*

Illapel (ēl-yà-pel'), a town of Chile, province Coquimbo. Pop. 3200.

Ille-et-Vilaine (ēl-e-vi-lān), a maritime department in the N. W. of France, lying between the English Channel and the department of Loire-Inférieure. It is watered mainly by the rivers from which it derives its name—the Vilaine, and its tributary, the Ille. Little more than one-half of the surface is arable. The cereal crops consist chiefly of wheat, meslin, rye and oats; other crops are buckwheat, hemp, tobacco, and flax. The minerals include iron, zinc, and lead. The principal manufactures are leather, sail-cloth, sacking, and coarse linens, and the coasting trade is active. Rennes is the capital; St. Malo the chief seaport. Pop. (1906) 611,805.

Illegitimacy (il-e-git'i-ma-si). See *Bastard.*

Illicium (il-li'si-um), a genus of eastern Asiatic and American evergreen deciduous shrubs, belonging to the nat. order Magnoliceæ. The plants of this genus are called aniseed-trees, from their fine aromatic scent. The fruit of *I. anisātum* (Chinese anise) is the star-anise of the shops (see *Anise*). *I. religiōsum* is a Japanese species, held sacred by the natives, who decorate the tombs of their dead with wreaths of it, and burn the fragrant bark as incense before their deities.

Illimani (il-yi-mä'nē), one of the loftiest peaks in the Bolivian Andes, fully 21,000 feet high, and covered with glaciers.

Illinois (il'i-noi or -nois), one of the North Central United States, bounded on the north by Wisconsin, east by Lake Michigan and Indiana, south-east by Kentucky, from which it is separated by the Ohio, and west by the Mississippi, separating it from Missouri and Iowa: greatest length, 370 miles; greatest breadth, 210; area, 56,665 square miles. The surface is somewhat hilly near the Ohio, and undulating towards the west; and a range of bluffs runs for a considerable distance along the margin

ILLINOIS

Scale of Miles
0 5 10 20 30 40 50 60

Longitude 92° 91° 90° 89° 88° 87° West from Greenwich

of the Mississippi; but with these exceptions the state is one continuous plain, with a gentle inclination towards the southwest. It has a greater proportion of arable land than any other state of the Union, the state standing centrally in the great prairie region, with its deep, rich soil. The only part of the state thickly wooded is the extreme south portion. The chief rivers are the Illinois, which traverses the state diagonally northeast to southwest, Rock, Kaskaskia, and Wabash. There are many smaller streams, and the state is very well watered. Indian corn and wheat are the chief objects of cultivation, but rye, oats, buckwheat, potatoes, turnips, cotton, hemp, flax, tobacco, castor-bean, etc., are also produced, and the cultivation of the vine is making considerable progress. Fruits are largely grown, including apples, peaches, plums, cherries, and the various berries; while potatoes, hops, tobacco, flax-seed, and broom-corn are among the other products. The common domestic animals are abundant, and immense numbers of swine are reared on the mast of the forests. Lead is found in vast quantities, and the ore (argentiferous galena) contains a considerable percentage of silver; the metal is found chiefly near the Wisconsin frontier, Galena being the centre of the mining district. Bituminous coal abounds, and the state ranks next to Pennsylvania in annual coal product. Several valuable salt springs are found in the east and south. The rocks mostly are limestone, gypsum, and sandstone. The climate, although somewhat humid, is generally healthy. The commerce and manufactures have been largely developed of late years, and there is a greater development of railroads than in any other state. The Illinois and Michigan Canal connects Lake Michigan at Chicago with the Illinois at La Salle (distance 96 miles), and is of sufficient size and depth to permit vessels to pass from the lake to the Mississippi, though as yet used only as a drainage canal for Chicago. There is a well-organized school system. The University of Chicago is one of the best endowed and largely attended of American seats of learning, and Illinois University, at Urbana, is a well-equipped institution, with about 5000 students. There is also the Northwestern University, at Evanston, with a very large attendance. Springfield is the seat of government, and Chicago, on Lake Michigan, the principal commercial depot. Illinois was constituted a separate territory in 1809, and admitted as a State into the Union in 1818. Pop. 5,638,591.

Illinois, a river of the United States, formed by the union of the Kankakee and Des Plaines, in the N. E. part of the state of Illinois. It flows thence S. W., and falls into the Mississippi about 20 miles above the mouth of the Missouri. It is 500 miles long, half of it being navigable. A canal connects the river with Chicago.

Illuminated MSS. See *Manuscripts.*

Illuminati (i-lū-ma-nā′ti; the enlightened), a name given to members of several societies, especially to those of a secret society founded in 1776 by Adam Weishaupt, professor of law at Ingolstadt, Bavaria, for mutual assistance in attaining a higher degree of morality and virtue. It spread over Roman Catholic Germany, and contained in its most flourishing condition 2000 members, among whom were individuals of distinguished talents and high rank. The constitution and organization were taken partly from the Jesuits and partly from the Masons. Dissensions, however, arose and in 1784 it was dissolved by the Bavarian government. The members were also called Perfectibilists.

Illusion (i-lū′zhon). Much attention has been devoted by experimental psychologists during recent years to the phenomena of optical illusion by means of geometrical figures. No complete classification has been made of these, but the following classes contain the best known: 1. Illusions of Reversible Perspective. There are certain figures which are capable of two or more perspective interpretations. It is characteristic of these figures that as one looks at them the shift of perspective occurs spontaneously and at irregular intervals. An instance of this is seen in Figure 1, which may be seen either as a square block resting upon the ground or as a block projecting upwards and to the left from the plane of the paper. 2. Illusions of Extent. These fall into two classes: Constant and Variable. An instance of the latter is seen in Figure 2. Although the dimensions in these figures are objectivelv similar, the filled spaces appear larger than the open. 3. Illusions of Direction. These also may be constant or variable. An instance of the former class may be seen in Figure 3, which is known as Von Recklinghausen's illusion. If the figure is held a short distance from the eye and

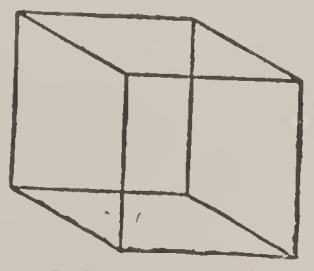


Fig. 1. Wheatstone's Cube.

its center steadily fixated, the hyperbolas become straight lines so that the figure resembles a chessboard. 4. Illusion of

Fig. 2. Helmholtz's Squares.

Association. These fall into two divisions, assimilative and contrastive, both of which may be produced by a series of rectangles according to the system of Müller-Lyer. 5. Mixed illusions. Produced by a combination of the preceding.

Fig. 3. Von Recklinghausen's Illusion.

6. Illusions of Movement. There are various explanations of these results, but it may be that the interpretation must be drawn from the sciences both of physiology and psychology.

Illyria (il-lir'i-a), ILLYR'ICUM, a name formerly rather loosely applied to a large tract of country on the east side of the Adriatic, the ancient Illyrians being ancestors of the modern Albanians. Piracy was carried on by the Illyrians, whose kings were therefore embroiled in quarrels with the Romans, which ended in their subjugation in 228 B.C. They sought from time to time to shake off their chains, but being always beaten, the country at last became a Roman province. The name of Illyrian provinces was given, by a decree of Napoleon in 1809, to Carniola, Dalmatia, and other countries, then part of the French Empire. After the fall of Napoleon the Illyrian Provinces were restored to Austria, and designated as the Kingdom of Illyria, a title which the country bore till 1849, when it was divided into the provinces of Carinthia, Carniola, and the Coast-lands.

Ilmen (il'men), a lake in Russia, gov. of Novgorod, near its western borders; length about 33 miles, breadth 28. It receives numerous streams, and discharges itself by the Volkhov into Lake Ladoga. It abounds in fish. There is another lake of this name in Russia (also called Lake Manitch), on the frontiers of the governments of Caucasus and Don Cossacks.

Ilmenau (ēl'me-nou), a town of Central Germany, in the Grand-duchy of Saxe-Weimar-Eisenach, on the river Ilm. It has a grand-ducal castle, manufactures of porcelain, terra-cotta ware, etc., and a hydropathic establishment. Pop. 11,222.

Ilminster (il'min-stėr), a small but ancient market town of England, in Somersetshire, 17 miles south by east Bridgewater. Pop. 2467.

Ilorin (e-lo-rēn), a town in the Western Soudan, about 150 miles N. E. of the Bight of Benin in Nupe, a great center of trade; pop. est. 60,000 to 80,000, mostly Mohammedans.

Image (im'ij), in optics, the spectrum or appearance of an object made by reflection or refraction. It is by means of optical images that vision is effected, or that the telescope and microscope are of use. See the articles *Optics*, *Eye*, etc.

Image Worship. See *Iconolatry.*

Imaginary Quantity (i-maj'i-na-ri), in algebra, such quantity as $-a^2$ in the equation $x^2 = -a^2$, when to find the value of x we should require to take the square root of $-a^2$; and this is impossible. Any algebraic expression containing $\sqrt{-1}$ is called an imaginary expression. The employment of imaginary quantities systematically has been the foundation of some of the greatest modern discoveries and improvements in geometry.

Imagination (i-maj-i-nā'shun), literally that faculty of the mind by which we can form mental *images* of things. Besides the power of preserving and recalling such conceptions, the imagination has the power to combine different conceptions, and thus create new images or mental pictures. It is this faculty which is more strictly termed imagination. In the creation of new images, or more properly in the combining of images which have previously been derived from objects of perception, the imagination operates according to the laws of the association of ideas. Its operations are nevertheless not wholly independent of the will, for by directing the attention to some leading thought, the

will can determine the limits within which the laws of association are to act, and by practice it can be fostered. Such free and yet regulated action of the imagination alone can give birth to the productions of the fine arts.

Imam (i-mäm′), a class of Mohammedan priests. In Turkey they attend in the mosques, call the people to prayer from the minarets, perform circumcision, etc. In ecclesiastical affairs they are independent, and are not subject to the mufti, though he is the supreme priest. They quit their office and reënter the lay order. The sultan, as chief of all ecclesiastical affairs, has the title of *imam*.

Imaus (i-mā′us), a name applied by the ancients sometimes to the Hindu Kush and the western part of the Himalayan range, and sometimes in a vague way to a range in Central Asia (supposed to be the Altaian Mountains), which they believed to divide the vast region to which they gave the name of Scythia, into two parts.

Imbecility (im-be-sil′i-ti), weakness of mind, such as puts a person considerably below the general run of mankind, but is not so great as to be called lunacy or idiocy, nor so well marked perhaps as to be classed under any one of the forms of insanity. Imbeciles sometimes display a considerable amount of intelligence in certain directions, and are often very cunning. They may be interesting, amusing, and even useful members of a community. Equity will not set a contract aside on the mere ground of imbecility; but its existence affords a material ingredient in examining whether it has been obtained fraudulently or by undue influence. In general the court is ready to support the obligation of any contract that a person of weak mind has entered into, unless it is of such a nature that a person of sound mind would not have agreed to it, or unless there is suspicion of fraud. An imbecile person may be summoned as a witness, but the degree of credibility attaching to his evidence naturally depends very much on the amount of intelligence he displays, and on the nature of the circumstances regarding which his evidence is offered.

Imber (im′bėr), Imber-goose, Ember-goose, a name sometimes given to the great northern diver.

Imbro (im′bro), or Imbros, an island of European Turkey, west from the entrance to the Dardanelles, 18 miles long and 8 broad. It is mountainous, well wooded, and intersected with richly-fertile valleys, producing wine, honey, oil, cotton, and lead. It has several villages. Pop. 1000, mostly Greeks.

Imeritia (ē-mē-rish′i-a), or Imerethi, Russian district on the south of the Caucasus, now included in the government of Kutais. It formed part of the Kingdom of Georgia in the fourteenth century; became afterwards independent, and in 1804 it was voluntarily ceded to Russia by the last of its sovereigns.

Immaculate Conception. See *Conception* (*Immaculate*).

Immersion (im-ėr′shun), in astronomy, the disappearance of one heavenly body behind another or into its shadow. Immersion occurs at the beginning, and emergence at the end of an occultation or an eclipse.

Immigration (im-i-grā′shun), the entry of aliens to a country for purpose of settlement and permanent residence. This subject has been treated in its general aspects under the head of emigration (which see). But the subject of immigration has a particular application to the United States, the present great population of which, aside from its few Indians, is wholly the result of alien inflow, forcible on the part of its negro population, voluntary on that of the whites. And within the recent period this inflow of settlers has proceeded at a rate unprecedented in the history of any other country, the United States having become the great reservoir into which flows the excess population of Europe, and in a measure that of various other parts of the world. The earliest permanent settlements of immigrants within the area of the United States was at Jamestown in 1607, New York in 1613, and New England in 1620; other localities being successively settled during the seventeenth and eighteenth centuries. Most of the nations of Europe were represented in the inflow, though the numbers were small as compared with those of a later date, the total immigration up to 1820 being estimated at only 250,000 persons, much less than that of a single year at the present time. The inflow of Africans began in the slave ships of an early date, the first reaching Jamestown in 1620. We have no official record of the number of settlers reaching this country until the year 1817, when Congress provided for the making of returns in the several customs districts. In the year named 22,140 arrived, a much larger number than in previous years, and the abuses and suffering on shipboard were so great that Congress was obliged to provide remedies, an act to regulate the ocean transport of passengers being passed in

1819. Since that date collectors of customs have reported the numbers of immigrants arriving in their districts, with age, sex, occupation, and country of birth. The arrivals since then, counting by decades, have been: for the decade ending 1830, 143,149; 1840, 599,128; 1850, 1,713,225; 1860, 2,598,214; 1870, 2,314,824; 1880, 2,812,191; 1890, 5,246,613; 1900, 3,844,420, being a total in the period named of more than 20,000,000 new inhabitants. In the decade 1900-1910 the rate of immigration rapidly increased, passing the million mark in the successive years, 1905-07, and reaching in 1907 the grand total of 1,285,349; the total for the decade being nearly 9,000,000. As for the character of this immigration, it was mainly desirable until within recent years, when much of it became undesirable. In the earlier period Great Britain and Ireland, Germany and Scandinavia supplied the bulk of newcomers, but during the past few decades Southern and Eastern Europe have supplied much the greater number of immigrants, especially Italy, Austria-Hungary and Russia. Immigrants from Canada and Mexico were not counted prior to July 1, 1907, but the census of 1900 showed in this country 1,183,225 persons born in Canada, and 103,445 born in Mexico. Many of the immigrants reaching this country have been for various reasons undesirable, and this was generally the case with the Chinese, who after 1869, when a treaty was made admitting them, came in such numbers that in 1882 a bill was passed prohibiting the entrance of any new Chinese for ten years. In 1892 the law was continued for a second ten years, and the policy of exclusion still holds good. At a later period Japanese laborers began to arrive in large numbers, and the opposition to them became so great that in 1907 acts were passed prohibiting the entrance of any Japanese and Corean laborers. Great numbers of the European immigrants have also proved undesirable for various reasons, such as ignorance, unhealthfulness, criminal record, lack of means of support, etc., and several restrictive measures have been passed; as yet not sufficient to satisfy the demand of the people. One great source of dissatisfaction is the tendency of immigrants to settle in the great cities and their vicinity, overfilling these already congested centers of labor, and to avoid seeking the agricultural districts, where they could be usefully employed. A bureau of information to aid in the latter purpose was established in 1907, its object being the beneficial distribution of aliens among the States and Territories desiring them. This has proved very useful in advising immigrants where they can find profitable employment. An immigration commission was also appointed for the study of problems at home and abroad connected with this subject. This has completed its labors and published several reports, the most important being in relation to the white slave traffic, or the importation of young women for purposes of vice. In 1909 a new act was introduced into Congress, entitled 'An Act to Regulate the Immigration of Aliens to and the Residence of Aliens within the United States.' It is intended in this to deal with the entire matter or immigration and to prevent as far as possible the irregularities existing under present laws. The demand of the people for stringent legislation on this subject, and for the restriction of immigration to those likely to prove useful and desirable citizens of the United States, continues insistent, and must be met in the coming years in a more drastic manner than heretofore.

Immortality (im-or-tal'i-ti), exemption from death; the state of everlasting life. The dogma of the immortality of the soul is very ancient. It is connected with almost all religions, though under an infinite variety of conceptions. By the immortality of the soul we understand the endless continuation of our personality, our consciousness, and will. There are so many reasons to render immortality probable, that with most nations the belief is as clear and firm as the belief in God; in fact the two dogmas are intimately connected in the minds of most men. The hope of immortality must be considered a religious conviction. Reason and religion command man to strive for continued perfection. This duty man cannot relinquish without abandoning at the same time his whole dignity as a reasonable being and a free agent. He must, therefore, expect that a continuation of his better part, as the necessary condition for his progress in perfection, will not be denied to him. Hence the belief in immortality becomes intimately connected with our belief in the existence and goodness of God. Among rude peoples the life after death is usually regarded as a state of being not essentially different from the present—one in which the hunter shall renew his chase, and his corporeal senses shall have their accustomed gratifications. Among the ancient Greeks and Romans the spirits of the dead were believed to live in the other world as a sort of shadows, and the life after death was also considered as a

shadow of the present. Among some peoples the imagination attributes changes of condition to the future life, and the doctrine of transmigration, or the progress of the mind or soul in different stages, is developed. Connected with the belief in the immortality of the soul is the belief in a state where souls are purified after death, which existed among the Egyptians and exists among many Christians. See *Purgatory.*

Immortelles (im-or-tel'; Fr.), a name for flowers, also known as *everlasting* flowers, and often made into wreaths for adorning graves.

Imola (ē'mō-lȧ), a town of Italy in the province of Bologna, on an island in the Santerno, 25 miles west by south of Ravenna. Besides its walls flanked by towers, it possesses an old castle situated on a commanding height, a cathedral and other churches. Pop. 12,058.

Impalement (im-pāl'ment; Lat. *palus*, a stake), the putting to death by thrusting a stake through the body. This manner of inflicting death was known to the Romans, though not practised by them. It is still practised in some half-civilized countries.

Impanation (im-pa-nā'shun). See *Consubstantiation.*

Impannel (im-pan'el), to form a jury by entering the names on the roll or *panel.* See *Jury.*

Impasto (im-pas'tō). the thickness of the layer or body of pigment applied to the canvas by an artist.

Impatiens (im-pā'shi-enz), a genus of curious annuals which ranks among the Balsaminaceæ. One species, *I. Noli-tangere*, indigenous in England, is called *noli-me-tangere*, or touch-me-not. *I. balsamina* is much grown for the beauty of its flowers, and is well known as a highly ornamental annual by the name of garden balsam. The species are numerous, and inhabit chiefly the East Indies, although some extend in Europe, Siberia and North America. The name refers to the elasticity of the valves of the seed-pod, which discharge the seeds when ripe or when touched.

Impeachment (im-pēch'ment), an accusation and prosecution for a crime or misdemeanor, in which the House of Representatives are the prosecutors and the Senate the body of judges. In Britain the House of Commons are the prosecutors, and the House of Lords the judges. The necessity of some tribunal distinct from the ordinary courts, for the trial of certain offences, or for any high misdemeanor in certain officers, is apparent, since the judges of the highest courts cannot in all cases safely be intrusted with the trial of each other. The most noted case of impeachment in this country was that of President Andrew Johnson, in 1868, he being charged chiefly with violation of the Constitution and the Tenure of Office Act. This memorable trial lasted three months, on each vote taken the Senate standing 35 for conviction and 19 for acquittal. As a two-thirds vote is necessary for conviction, the impeachment failed by one vote. In England impeachment is a rare event, the last instance being the trial of Lord Melville, in 1805. A majority vote there is sufficient for conviction, but the crown may pardon the offender. Any civil officer may be impeached.

Impenetrability (im-pen-e-tra-bil'-i-ti), in physics, that property of matter which prevents two bodies from occupying the same space at the same time; or that property of matter by which it excludes all other matter from the space it occupies.

Impennes (im-pen'nez), a name given to swimming birds with small wings which have only rudimentary feathers, as the penguins.

Imperator (im-pe-rā'tur), among the ancient Romans, a term originally applied to a military commander, one who held the *imperium*, or military power. In later times no one received this title who had not defeated a hostile force of at least 10,000 men. After the overthrow of the republic *imperator* became the highest title of the supreme ruler, and acquired the signification which we attach to the word *emperor.* It was still given, however, to triumphant generals, and, in this case, has its old signification. The emperors appear to have used it because they were considered as superior to all the generals. See *Emperor.*

Imperial (im-pē'ri-al), pertaining to an emperor or empire; thus, an *imperial* crown is such as is worn by the German emperor; the *Imperial* parliament is that of the United Kingdom. —A size of paper, measuring 30 in. by 22, is also called *imperial.*

Imperial Chamber. See *Chamber.*

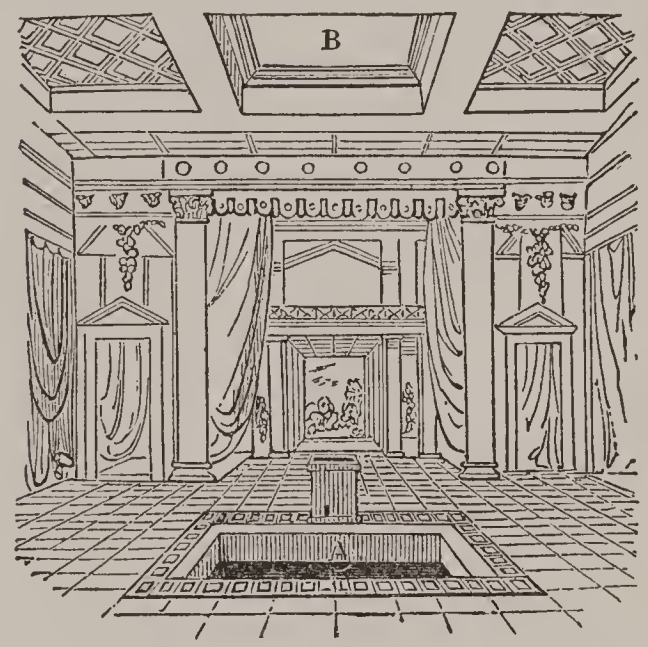
Impetigo (im-pe-tī'gō), a skin disease consisting in an eruption of itching pustules, appearing in clusters, and terminating in a yellow, thin, scaly crust. It occurs most frequently on the extremities.

Impey Pheasant (im-pē; *Lophophŏrus refulgens* or *Impeyānus*), a bird of the pheasant family (Phasianidæ) remarkable for the splendid colors and metallic luster of the

plumage of the male, whence it is called in India (of which it is a native) *monaul*, meaning bird of gold. It is found in the high and cold regions of the Himalaya, and is of the size of a small turkey. It obtained the name of Impey pheasant from the fact that Lady Impey was the first who attempted (unsuccessfully) to introduce the bird alive into Europe.

Implacentalia (im-pla-sen-tal'i-a), the aplacental mammals. See *Aplacental.*

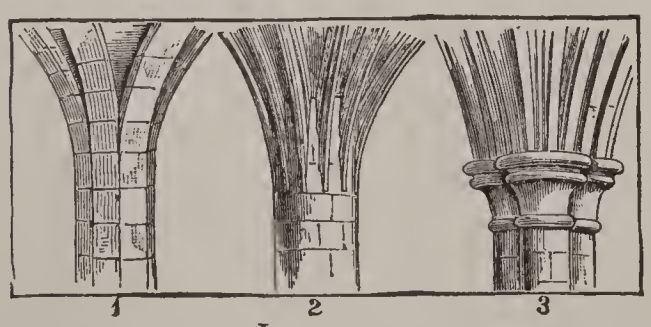
Impluvium (im-plū'vi-um; Lat. *in*, into, *pluto*, to rain), in ancient architecture, a term which denoted in the houses of the ancient Romans a basin in the middle of the atrium or entrance-hall, below the *compluvium* or open space in the roof, to receive the rain. See *Atrium.*



Roman Atrium.—A, Impluvium; B, Compluvium.

Impoon (im-pön'), a kind of antelope, Duykerbok (which see).

Impost (im'post), (1) a tax, tribute, or duty, particularly a duty or tax laid by government on goods imported. (2) In architecture, the point of junction between an arch and the column, pier, or wall on which it rests. It is often marked by horizontal mouldings, though these may be absent. Imposts have received various names, according to their character. Thus, a *continuous impost* is where the mouldings are carried down the pier; a *discontinuous impost* where there are no mouldings, but the pier is of a different section from the arch; *shafted imposts* are where the arch mouldings spring from a capital and differ from those of the pier.



Imposts.

1, Continuous. 2, Discontinuous. 3, Shafted.

Impounding-Cattle. See *Pound.*

Impressionism (im-pres'yun-izm), the term applied to a modern school of art, which originated in France and has spread to other countries. The work of the impressionists was first exhibited in 1867 and is now to be seen in every exhibition of art work. The aim of the impressionists is to get rid of artistic tradition and to look at nature from an original standpoint. This was also the aim of the pre-Raphaelites, but the impressionists differ from the latter in portraying only the salient features of nature visible in cursory examination and rendering these by brushwork of the thinnest and loosest description. In the work of some of them little care for beauty of color, form, or expression is visible, and the extremists of this school produce work the reverse of attractive.

Impressment of Seamen (impres'ment), the act of compelling persons, especially seafaring men, to serve in the navy. The power of impressing seamen, formerly a common practice in England, though still existing, has fallen into abeyance since the conclusion of the general war in 1815. Impressment was of ancient date, and uniformly practised throughout a long series of years. It has never been adopted in the United States.

Imprimatur (im-pri-mā'tur; Latin, 'let it be printed'), the word by which the licenser allows a book to be printed in countries where the censorship of books is exercised in its rigor. See *Books, Censorship of.*

Imprisonment (im-priz'n-ment), the restraint of a person's liberty, whether in a prison, the stocks, or by merely keeping in custody. It is usually inflicted by way of punishment, the power of sentencing to imprisonment being conferred on certain courts or magistrates, and strictly limited by law. A person may be imprisoned, however, who is merely accused of a crime, in which case he can demand to be released on bail. Imprisonment for ordinary debt is now practically abolished in Great Britain and the United States.

Impropriation (im-prō-pri-ā′shun), in the English Church, the transfer of a benefice to the possession of a layman, the annexing of benefices to ecclesiastical corporations being called *appropriation*, though they are sometimes identical. Appropriations were originally annexed to bishopries, prebends, religious houses, etc.; but on the dissolution of the monasteries in the reign of Henry VIII the appropriations of the several benefices belonging to them were given to the king, and were afterwards granted out from time to time by the crown. It was after this time that the term *impropriation* was introduced to denote a benefice in the hands of a layman. The appropriator deputed some person to perform divine service in such parish, who, being merely his deputy or vicegerent, was called *vicar*, and his stipend was at the discretion of the appropriator. The distinction therefore of a parson and vicar is that the former is entitled to all the ecclesiastical dues of his parish, while the vicar is in effect only the curate of the real parson (the appropriator), and receives but a part of the proceeds.

Improvvisatori (im-prov-iz-a-tō′rē), the name given in Italy to persons who compose and declaim extemporaneously a poem on any given subject, or sing it, accompanying their voice with an instrument. This has long been a practice in Italy, and many of the *improvvisatori* have acquired considerable celebrity. The poet Metastasio at a very early period showed an extraordinary talent for this kind of composition, but the exercise of it cost so much effort that from a regard to his health he was obliged to give it up. Even at the present day Italy abounds in this class of poetical composers. The printed works of the improvvisatori who have been most admired have never passed mediocrity, and it is probable we should not have had such beautiful poems from Metastasio if he had not been obliged to renounce extemporaneous poetry.

Imputation (im-pū-tā′shun), as a term in Christian theology, is used to signify, on the one hand, the reckoning of the sins of man to Christ, and, on the other hand, the reckoning of the righteousness of Christ to believers.

Ina (ī′na), or INE, king of the West Saxons in the seventh and eighth centuries. He succeeded Ceadwalla about 689, and after having obtained advantages over the people of Kent in 694 he turned his arms against the Britons, from whom he wrested Somersetshire and other parts of the west of England. He then made war on the Mercians; but the contest was terminated, without much advantage to either party, by a bloody battle in 715. He resigned his crown and went as a pilgrim to Rome (728), where he passed the rest of his days in devotion. He was one of the principal legislators of the Anglo-Saxons. His laws are the oldest known to us among the Anglo-Saxon kings, except those of the kings of Kent, and served as the foundation of the code formed by Alfred the Great.

Inagua (ē-nä′gwa), GREAT and LITTLE, two islands; the former about 40 miles from the eastern extremity of Cuba, low and intersected with lagoons, and affording good pasture land; area, 660 sq. miles; pop. 1500. Little Inagua is quite small.

Inaja Palm (in-a-ja′; *Maximiliana regia*), a South American palm growing to the height of over 100 feet, with leaves 30 to 50 feet long. The spathes are so hard and woody as to serve for cooking food on the fire; they are also used as baskets, etc. The fruit is edible.

Inarching (in-ar′ching), the same as grafting by approach. See *Grafting*.

Inca (in′ka), or YNCA, a word signifying 'chief,' which the natives of Peru gave to their kings and princes of the blood before the Spanish conquest. See *Peru*.

Incandescent Light (in-kan-des′-ent). See *Gas* and *Electricity*.

Incantation (in-kan-tā′shun), a certain formula of words, supposed to have some magical effect, especially if uttered with the accompaniment of certain ceremonies. Incantations are still common as a part of popular medicine among the uneducated in many countries.

Incarnation (in-kär-nā′shun; Lat. *in*, and *caro*, *carnis*, flesh), a word used to express the manifestation of the Deity in the flesh under the human form; thus we speak of the *incarnation* of Christ. The Hindus believe in innumerable incarnations of their deities. The most celebrated of these in Hindustan are the nine incarnations of Vishnu. See *Avatar*.

Incense (in′sens), aromatic substances burned in religious rites on account of the sweet odor they emit. The custom of burning incense is ancient and widely spread. Among the Jews the practice was enjoined as part of the worship of the sanctuary (Ex., xxx, 27), the ingredients of the incense also

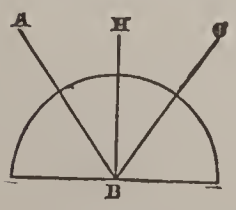
being laid down, and it was to be burned on a special altar called the *altar* of *incense*. This altar was made of acacia (shittim) wood, and was overlaid with gold, hence it was also called the *golden altar*, as distinguished from the altar of burnt-offering, which was made of brass. The incense was burned daily—morning and evening. In ancient Egypt, Assyria, Babylonia, India, Greece, and Rome incense-burning was part of the worship of the gods, and it is still employed as part of the Buddhist ceremonial. Both the Greek and the Latin churches use incense in worship, but the practice cannot be shown to have existed among Christians till after the first four centuries.

Incest (in'sest), sexual intercourse within the prohibited degrees, which by the laws of England and Scotland are founded on the Levitical code, and include degrees both of consanguinity and of affinity. (See Leviticus, chap. xviii.) In England incest is an ecclesiastical offense, and is left to the jurisdiction of the spiritual courts. In Scotland and some of the States in this country it is a criminal offense.

Inchbald (inch'bald), ELIZABETH, an English novelist and dramatic writer, born in 1753; died in 1821. She married the actor Inchbald, who died in 1779. She continued on the boards about eight years, but retired from the stage in 1789, and devoted herself to literary pursuits. She wrote among other works two novels, which display much original thought and genuine pathos —the one entitled, *A Simple Story* (1791), the other, *Nature and Art* (1796). She edited the *British Theater*, a collection of dramas, with biographical and critical remarks (25 vols. 1806-09); a collection of farces (7 vols.); and the *Modern Theater* (10 vols. 1809).

Inchcolm (insh-kōm'), a small island of Scotland, in the Firth of Forth, off the coast of Fifeshire, with the ruins of a monastery founded by Alexander I in 1123, of which Walter Bower, the continuator of Fordun, was abbot from 1418 till 1449.

Inchkeith (insh-kēth'), a small island of Scotland, in the Firth of Forth, off the Fifeshire coast, containing a lighthouse.



Incidence (in'si-dens), ANGLE OF, the angle which a ray of light falling on a reflecting or refracting surface makes with the perpendicular or normal to the surface. The angle of incidence, A B H, is always equal to the angle of *reflection*, H B C.

Inclination, MAGNETIC, or MAGNETIC DIP. See *Dipping Needle.*

Inclination Compass, same as *Dipping Needle.*

Inclined Plane (in-klīnd'), a plane forming with the horizontal plane any angle whatever excepting a right angle. It is one of the mechanical powers by which a small force under certain conditions is used to overcome a greater force. When a body lies on an inclined plane part of its weight is supported, so that if a cord be fastened to it and pulled, a force less than the weight of the body acting in a direction parallel to the plane will prevent it from sliding, or will move it up the plane. Thus a heavy wagon is raised on an inclined road by a horse which would be quite unable to exert a pull equal to a quarter of the weight of the wagon. Neglecting friction, the force parallel to the plane necessary to raise the body is equal to the weight of the body multiplied by the vertical height through which it is lifted, divided by the distance it is moved along the plane.

In Cœna Domini (in sē'na dom'i-ni), a papal bull, so called from its first words, it being annually read 'at the Lord's Supper' on Holy Thursday. Its earliest form was that promulgated in 1363 by Urban V anathematizing all heretics and favorers of heretics without distinction. The bull was afterwards extended and modified by several popes to include those who imposed taxes upon the clergy for the needs of the state, and in its latest form (promulgated by Urban VIII in 1627) specially anathematized all Hussites, Wickliffites, Lutherans, Calvinists, Unitarians, etc.; all schismatics, pirates who disturbed the papal seas, forgers of papal letters; all who should attack or conquer the papal territory, etc. The bull was annually promulgated at Rome till the year 1770, when a much modified document took its place, this in its turn being withdrawn by Pius IX in 1869.

Incombustible Cloth (in-kom-bus'-ti-bl), cloth rendered uninflammable by artificial means. This may be done by steeping the fabric in borax, phosphate of soda or ammonia, alum or sal-ammoniac; but these salts are not suitable for fine fabrics, and that which has been found to answer the purpose most effectually is tungstate of soda. A solution containing 20 per cent. of this salt, along with 3 per cent. of phosphate of soda, renders

a fabric perfectly non-inflammable, and does not interfere with the ironing.

Income Tax, a tax levied directly from income of every description, whether derived from land, capital, or industry. A tax of this kind was first imposed in Great Britain, in January, 1799, during the ministry of Mr. Pitt. It is still retained and a considerable part of the revenue of that kingdom is derived from it. At present a tax of 10 d. per pound is levied on all incomes above £150, with a deduction allowed on those under £400. A tax of this kind has had only a ten years' existence in the United States (1861-70), it being imposed to aid in raising revenue during the Civil war. At first it was fixed at 3 per cent., but in 1865 was increased to 5 per cent. and the tax on all incomes over $10,000 was fixed at 10 per cent. on the excess over $5000. It was repealed in 1870, the total sum raised in the ten years being nearly $365,000,000. A similar tax was enacted in 1894, but was ineffective, being declared unconstitutional by the Supreme Court. In 1909 a resolution was adopted by Congress providing for an amendment to the Constitution legalizing an income tax. Ratification by the legislatures of three-fourths of the States was necessary to make this act valid, and by the end of 1911 the assent of a small number of States was still needed.

Incommensurable (in-ku-men'sū-ra-bl), in mathematics, a term applied to two magnitudes when they cannot both be measured by the same quantity, that is, when they do not contain it one or more times exactly. The diagonal and side of a square are an example.

Increment (in'kre-ment), unearned. This phrase first came into use in the Henry George system of land tax, in which it is claimed that much unimproved land is to be found in cities which has increased greatly in value as a result of improvements on surrounding land. This extra value is spoken of as the unearned increment, and it is claimed that it should be made subject to taxation sufficient to force the owners to improve their land. The phrase came in use again in 1909 as a feature of the Lloyd George budget of British taxation. He claimed that portions of the many landed estates of Britain had gained a large unearned increment of value through surrounding improvements, and that this paid a very inadequate rate of taxation. His effort to tax this land at its true value met with vigorous opposition in the House of Lords, but the Lords were in the end obliged to pass the bill, and the unearned increment of value on British estates no longer escapes taxation.

Incubation (in-kū-bā'shun), in pathology the period between the introduction of the morbific principle and the outbreak of the disease. It is then gathering head in the system, and indicated only by such general symptoms as loss of appetite or sleep, etc. In epidemic and contagious diseases the period of incubation is well defined.

Incubation, the mode in which birds commonly bring forth their young, that of sitting on the eggs till they are hatched by the natural heat of the body. In general it is the female which undergoes the labor of incubation, but among some species, chiefly of monogamous birds, the male relieves the female while she seeks her nourishment; in others the male feeds her. Some birds, like the cuckoo, abandon their eggs to be hatched by others. In a state of nature birds generally commence to sit in spring. The time of incubation varies with different species, but is always the same with the same species. In the hummingbirds it is 12 to 14 days; in the swallow and lark, 15; the canary, from 15 to 18; crow, 20; common hen, 21; pheasant, partridge, etc., 22; peacock and turkey, 30; swan, 40-45; cassowary, 62.—*Artificial incubation*, the hatching of eggs by prolonged artificial warmth, has been long practised among the Egyptians and Chinese. Attempts have been made to carry out the artificial system on a considerable scale, both in America and England, and with remarkable success.

Incubus (in'kū-bus), a spirit or demon, to whom was formerly ascribed the oppression known by the name of *nightmare*. These demons play a somewhat important part in the superstitions of the middle ages.

Incunabula (in-kū-nab'ū-la), a term applied by bibliographers to editions of books printed during the early period of the art. It is generally limited to works which appeared previous to 1500.

Indemnity (in-dem'ni-ti), a term frequently employed in politics and jurisprudence. It is used in various significations, but is usually applied to an act of the legislature passed for the purpose of relieving individuals, especially in an official position, from the penalties to which they may have rendered themselves liable by some violation of the law whether by act or omission, or in case of members of government in consequence of exceeding the limits of their strict constitutional powers.

Indenture (in-den'tūr), a deed entered into between two or more parties, and so called because duplicates of every deed between two or more parties were once written on one skin, which was cut in half, with a jagged or indented edge, so that they were seen to belong to one another. See also *Apprentice.*

Independence (in-dē-pen'dens), a city, capital of Montgomery County, Kansas, on the Verdēgris River, 36 miles from Humboldt. It is in a fertile country and is an agricultural trade center. The manufactures include cotton, paper, bricks, tiles, flour, etc. It lies in a coal, petroleum and natural gas district. Pop. 10,480.

Independence, a city, capital of Jackson County, Missouri, 10 miles E. of Kansas City, and 4 miles S. of the Missouri River. It has fruit growing, canning, and stock-raising industries and various manufactures. Pop. 9859.

Independence Day, a holiday held in the United States on the 4th of July, this being the day in 1776 in which the Declaration of Independence was adopted by Congress. It is kept with noisy demonstrations of fireworks, with patriotic orations, etc.

Indeterminate (in-de-tėr'min-āt), in mathematics, having an indefinite number of values or solutions. *Indeterminate analysis* is a branch of algebra in which there are always given a greater number of unknown quantities than there are independent equations, by which means the number of solutions is indefinite.

Index Librorum Prohibitorum ('list of prohibited books'), in the Roman Catholic Church, a title used to designate the catalogue or list of books prohibited by ecclesiastical authority, on account of the heretical opinions supposed to be contained in them, or maintained by the authors or editors of them; when the list or catalogue is of books allowed to be read after correction or alteration, agreeably to the orders of the Papal authorities, it is termed *Index Expurgatorius.* Such prohibitory catalogues have been in use from a very early period in the history of the church, commencing with a list of prohibited books drawn up by a council held at Rome in 494, or even earlier with the proscription of the writings of Arius. These prohibitions, in fact, were often issued by other than the Papal authorities. In 1408 a synod at London prohibited the reading of the books of Wickliffe. In 1544 the Faculty of Theology in Paris published a catalogue of books censured by them, and in 1546 the University of Louvain published an index of books regarded as dangerous. The indexes of the church were a subject of consideration at the Council of Trent, which referred the business of drawing up a complete index to a select committee under the pope. Their Index was published in 1564, and besides the catalogue of prohibited books contains general rules relative to such books. In 1586 a special ecclesiastical board, the Congregation of the Index, was formed, consisting of a cardinal-prefect, with other cardinals and examiners of books, with authority to judge of new works, to indicate those of which the reading is entirely prohibited, and those which are permitted after correction, and also to grant to learned and pious men the right of reading prohibited works. The most important editions are those of Alexander VII in 1664, and of Benedict XIV in 1758. The latest edition appeared in 1900, according to rules of 1897. In 1607 the first volume of an Index Expurgatorius was published at Rome, edited by the Dominican Brasichelli. In Spain the Inquisition maintained its right to issue its own index, the last edition of which, dated 1790, was reprinted, with a supplement in 1805. The Spanish indexes are mostly both prohibitorial and expurgatorial.

Index Expurgatorius. See preceding article.

India (in'di-a), a name properly applicable to the whole of the British Indian Empire, which includes Burmah (which see), but popularly restricted to the great central peninsula of Southern Asia. It forms an irregular triangle, insulated from the rest of Asia by the almost impassable ranges of the Himalayas, the Hindu-Kush, and Suleiman Mountains, and by the Indian Ocean. Its length north and south, and its greatest breadth east and west, are both about 1900 miles. Within these borders is an area of about 1,773,168 sq. miles, with a population (1901) of 294,361,056. India may be regarded as consisting of three separate regions, well defined by differences of soil, climate, productions, and population. The first is the region of the Himalayas. Immediately south of the Himalayas lies the vast North Indian Plain, containing the most fertile and densely-populated portions of the empire. South of the northern plain rises the third region of India, the triangular plateau of the Deccan, which has a general elevation of from 2000 to 3000 feet. Its northern scarp is formed by a number of hill ranges known as the Vindhya

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Mountains. The other two sides of the Deccan are formed by the Eastern and Western Ghâts, which stretch southwards along the eastern and western coasts of India, the latter rising in the Nilghiris or Neilgherries to the height of 8760 feet. (See *Ghâts.*) The vast North Indian plain is watered by three distinct river systems, which collect the drainage of both the northern and southern slopes of the Himalayas. The first of these systems rises on the northern side of the Himalayas, and makes way through their western ranges into the Punjab as the Indus and Sutlej. The second rises in the same quarter, not far from the sources of the Indus and Sutlej, but flows in an opposite direction, and enters India on the east as the Brahmaputra of Assam and Eastern Bengal. As these two systems convey to India the drainage of the Tibetan slopes of the Himalayas, so the third system, the Ganges, with its tributary the Jumna, drains the southern slopes; traverses the central part of the Indian plain; unites near its mouth with the Brahamaputra and forms the immense delta known as the Sunderbunds. The Ganges for thousands of years has occupied a prominent place in Indian civilization, and was the sole channel of traffic between Upper India and the seaboard until the opening of the railway system in 1855. In the Deccan the Nerbudda and Tapti carry the drainage of the southern slopes of the Vindhyas into the Gulf of Cambay; and the Godavari, the Kistna (Krishna), and Cauvery rise in the Western Ghâts, and traverse the whole of the central table-land, reaching the sea on the eastern shores of the peninsula. The Indian rivers in the lower portions of their courses afford a natural system of irrigation, but in the higher parts an extensive system of canal irrigation is required. The Ganges and Jumna canals alone irrigate an aggregate area of about three million acres. The coasts of India have very few indentations, and consequently few good natural harbors. There are no lakes of any extent, Chilka and Kolair on the east coast being the largest.

Climate.—In Southern India the climate, of course, is tropical, and generally the heat is very great. Among the higher elevations of the Himalayas an Alpine climate prevails. The Indian plains are, especially in summer, sultry, unhealthy, and partly barren. The Deccan and the slopes of the Himalayas enjoy a temperate climate. The climate of the Nilghiris is healthy and pleasant, and several sanatoria for Europeans have been established there, as well as on the Himalayas. Throughout the entire country there are only two annual seasons, the dry season and the rainy season. The rainfall depends upon the monsoons. On the western coast the rainy season begins with the southwest monsoon, and lasts from May till November; on the east coast the rainy season, following the southeast monsoon, lasts from November till March. The rainfall, however, is distributed with great irregularity.

Botany and Zoology.—The flora of India offers nothing very distinctive. In the Himalayas it has to a considerable extent a European character; in the south it is tropical. Many plants of temperate climates, such as wheat, barley, European vegetables, etc., are grown in the northwestern and other parts, while various products of warmer regions are also cultivated, such as cotton, rice, indigo, oil-seeds, jute, tobacco, sugar-cane, cocoanut, date and other palms, spices, etc. Coffee, tea, and cinchona, though of recent introduction, are now extensively cultivated in India, the first particularly on the slopes of the Western Ghâts and in the Nilghiris. The tea-plant is also grown in the south, but especially in Assam and along the lower slopes of the Himalayas. European fruits abound, and among cultivated fruits may be mentioned the mango, plantain, pomegranate, citron, orange, lime, melon, fig, almond, pineapple, guava, jack, and tamarind. Among trees the teak forests under the protection of the government are of most economic value. The bamboo, the banyan, the sappan, the saul, etc., are all characteristic of Indian forest scenery. In Bengal and some other parts the natives live chiefly on rice, but millet is the staple food, grain, barley, wheat, with sweet potatoes, onions, garlic, etc., being also largely found. Opium is cultivated in Bahar, Benares, and Malwa. The vast forests of India are tenanted by great numbers of wild animals, birds, and reptiles. Large herds of elephants are still met with in Nepaul, Eastern Bengal, and the Nilghiris; the bear, the wild boar, and rhinoceros chiefly in the woods of the Eastern Himalayas; the tiger is found in every part of the country; the lion is now almost extinct. Other carnivorous mammals are the leopard or panther, cheetah, wolf, fox, jackal, and hyena. Several antelopes and deer, wild sheep and goats, the wild ass, the great gaur ox or 'bison,' the wild buffalo, are among the fauna. Snakes and reptiles in all varieties are very numerous, and the cobra and other poisonous snakes cause numerous deaths. Among domestic animals are oxen, camels, horses, mules, sheep and goats. Of birds, eagles,

tury the Portuguese, following the wake of Vasco da Gama, had established factories and fortresses on the coasts of Malabar, and soon extended their power over nearly all the ports and islands on the coasts of Persia and India. In 1595 the Dutch gained a footing in India. The English East India Company began its commercial settlements in India in 1613, Surat being the chief station. (See *East India Company.*) A grant of a small territory around Madras was received from the Rajah of Bijnagar in 1639, on which was erected the fort of St. George. Madras became a presidency in 1654. Calcutta, ultimately the seat of government in India, was settled in 1690, and became a presidency in 1707. The English early came into collision with the Portuguese and Dutch, but it was the struggle with the French in India, whose first settlements were founded in 1604, for influence over the native princes, that led step by step to the establishment of the British empire in India. The first conflict with the French took place in 1746, when the English lost Madras, which was, however, restored by the treaty of Aix-la-Chapelle. In 1751 Dupleix, the French governor at Pondicherry, was powerful enough to place creatures of his own on the thrones of the Deccan and the Carnatic. The English supported rival candidates, and the result was a second war, which left English influence predominant in the Carnatic, though the French still controlled the Deccan. The most memorable incident in this war was Clive's capture of Arcot. About this time important events took place in Bengal, then a subordinate presidency to that of Madras. The Nawab of Bengal, Siráj-ud-Daulá (Surajah Dowlah), attacked the English settlement at Calcutta with a large army, forced it to capitulate, and thrust the prisoners, to the number of 146, into the Black Hole or common prison of the garrison, a room 18 feet square, with two small windows. After a night of unparalleled suffering only twenty-three were found alive in the morning. Clive was at once sent with an armament from Madras, recovered Calcutta, attacked and took the French settlement at Chandernagore, routed the Nawab's army at the battle of Plassey (June 23, 1757), and placed Mir Jaffier on the vice-regal throne, with consent of the Mogul court. In the south the English were equally victorious. A force despatched by Clive took Masulipatam, and the victory gained by Coote at Wandewash on January 22, 1760, completed the destruction of the French power in India.

In Bengal Mir Jaffier soon found himself unable to meet the exorbitant claims of his allies, and in 1760 he was deposed in favor of his son-in-law, Mir Kasim, who agreed to pay the balance due by Mir Jaffier as well as grant the districts of Burdwan, Midnapore, and Chittagong to the English. But disputes soon led to a war, in which Mir Kasim was worsted and forced to flee. The British retained the collectorship or fiscal administration of Bengal, Behar, and Orissa, under the fiction of a grant from the Mogul emperor. A nominal native ruler, however, was still appointed in the shape of a nawab, who received an allowance of £600,000, and the actual collection of the revenues was still left to the native officials. This system of double government established by Clive was abolished in 1772 by Warren Hastings, who appointed English officers to collect the revenues and preside in the courts, and thus laid the foundations of the present system of British administration in India. In 1774 Hastings was made governor-general of India. Among the notable measures of his vigorous rule were the refusal of the £300,000 of the Bengal tribute to the Mogul emperor, the sale of the provinces of Allahabad and Kora (assigned by Clive to the emperor in 1765) to the nawab of Oudh, and the loan of British troops to the same nawab for the subjection of the Rohilla Afghans. For these and other acts, such as the extortion of heavy fines and forfeitures from the Begum of Oudh and the Rajah of Benares, Hastings was impeached on his return to England. (See *Hastings.*) In 1778 the intrigues of the Bombay government led to the first war with the Mahrattas, in which the British arms were only saved from disgrace by the achievements of the Bengal army which Hastings sent to the aid of the other presidency; and in the war with the Sultan of Mysore the diplomatic skill of Hastings, and the valor of the Bengal troops under Sir Eyre Coote, again won victory for the British. In 1786 Lord Cornwallis succeeded Hastings as governor. His rule is memorable chiefly for the war with Tippoo, Sultan of Mysore, which terminated in the sultan having to surrender one-half of his dominions to the British and their allies. Sir John Shore succeeded as governor-general in 1793. He was followed by the Marquis of Wellesley, who arrived in 1798, and whose policy eventually made the British power paramount from the Himalayas to Cape Comorin. Under him Tippoo of Mysore was completely overthrown (1799) and the second Mahratta war successfully concluded. Sir Arthur Wellesley (afterwards Duke of Welling-

ton) having won the victory of Assaye September 23, 1803), and General Lake that of Laswaree (November 1, 1803). In 1805 Lord Cornwallis went out as governor-general for the second time. He died soon after his arrival, and was succeeded by Sir George Barlow, and he by Lord Minto in 1807. In 1809 some disturbances at Travancore and Cochin led to these regions being placed under British control. During the governorship of the Earl of Moira (Marquis of Hastings, 1814-23) there was a war with the Goorkhas of Nepaul, which after a short struggle ended with the cession to the British of Kumáon; and another with the three great Mahratta princes, the Peshwá of Poona, the Rajah of Nágpur, and Holkar of Indore. The Peshwá's territory was annexed; the other Mahratta princes were compelled to accept alliances placing them under British protection. A new province, the nucleus of what are now the Central provinces, was formed out of territory recovered from the Pindárís. In 1823 Lord Amherst succeeded as governor-general. During his administration the first Burmese war arose, and was concluded in 1826 by the cession to the British of the provinces of Aracan and Tenasserim. Under Lord William Bentinck's rule (1828-35) administrative reform and the moral elevation of the peoples of India were chief subjects of consideration. In 1836 Lord Auckland assumed the governorship. Two years later the Afghan war broke out, and terminated in the disastrous British retreat. (See *Afghanistan.*) During Lord Ellenborough's administration Sind was annexed. Sir Henry (afterwards Lord) Hardinge succeeded in 1844, and the year following the Sikhs, originally a religious sect who had conquered the Punjab, crossed the Sutlej in great force. Four hotly-contested battles, at Mudki, Firozshah, Aliwál and Sobráon, left the British masters of the field. Part of the Sikh territory was annexed, and the infant Dhuleep Singh recognized as rajah of the rest. During the governor-generalship of the Earl of Dalhousie, 1848-56, a new war broke out with the Sikhs, and after their final defeat by General Gough at Gujerat, February 21, 1849, the Punjab was annexed to the British dominions. This was immediately followed by the second Burmese war, ending in the annexation of Pegu, June 20, 1853. The Indian states of Sattara, Jhansi, and Nágpur were, on the failure of the native succession, annexed to the British possessions, 1852-56, and Oudh was also brought directly under British rule. During the same administration the extensive scheme of Indian railways and telegraphs and steamship connection with Europe *via* the Red Sea was planned and inaugurated, the Ganges Canal opened, and the Punjab Canal begun.

The administration of Viscount Canning (1856-61) was distinguished by a short war with Persia, and especially by the great Sepoy mutiny. Several outbreaks among the native soldiers took place during March, 1857. The first formidable revolt, however, was at Meerut on May 10th, where the Sepoys of the 3d Light Cavalry, assisted by the 11th and 20th Regiments of infantry, rose and massacred the Europeans. They then fled to Delhi, where they were immediately joined by the native garrison. Here another massacre took place, and the dethroned descendant of the Moguls once more assumed the sovereignty. The revolt spread rapidly through the Northwestern Provinces and Oudh, down into Lower Bengal. Only in the Punjab the prompt measures of the governing officials in disarming the Sepoys prevented an outbreak, and the Sikh population continued steadily loyal. Wherever the mutiny broke out it was attended with savage excesses; women were outraged, and Europeans without distinction of age or sex barbarously murdered. At Cawnpore the revolted Sepoys were headed by Nana Sahib, the heir of the last Peshwá of the Mahrattas. After a heroic but fruitless attempt to defend themselves, the Europeans capitulated on the sworn promise of Nana Sahib to allow them to retire to Allahabad. On May 27th the survivors, about 450 in number, were embarking when they were attacked by the Nana's troops, and the men indiscriminately massacred. The women and children, 125 in number, were carried back to Cawnpore and kept till the 15th of July, when they were all cut to pieces on the approach of Havelock's army. Cawnpore was stormed the day following. At Lucknow Sir Henry Lawrence had the foresight to fortify and provision the Residency, where the garrison held out till relieved by Havelock and Outram on September 25th. But Havelock was in turn besieged, and was with difficulty relieved (November 17) by Sir Colin Campbell, afterwards Lord Clyde. Delhi, meanwhile, had fallen, chiefly owing to the skill and valor of Sir John Lawrence. By May, 1858, when Bareilly was taken, Sir Colin Campbell and Sir Hugh Rose had restored order, and the mutiny was at an end.

In 1858 the direct sovereignty of India, and the powers of government hitherto vested in the East Indian Company, were

vested in the British crown. Lord Canning returned to England early in 1862, and was succeeded by the Earl of Elgin, who died in 1863. Sir John (afterwards Lord) Lawrence was governor-general from 1863 to 1868, when he was succeeded by the Earl of Mayo, who did much to develop the material resources of the country by removing the restrictions upon trade between the different provinces, and constructing roads, canals, and railways. He was assassinated by a Mohammedan fanatic in the Andaman Islands, February 8, 1872. Lord Northbrook became viceroy in 1872. During his administration a famine in Lower Bengal, successfully obviated by a vast organization of state relief (1874), the dethronement of the Gaekwár of Baroda for disloyalty (1875), and the tour of the Prince of Wales through India (1875-76), were the chief events. In 1876 Lord Lytton was appointed viceroy, and on January 1, 1877, Queen Victoria was proclaimed Empress of India at Delhi. In 1877-78 another disastrous famine occurred, and despite the most strenuous efforts of the government over five million persons are said to have perished. In 1878 the intrigues of Shir Ali, amir of Afghanistan, with Russia, led to a declaration of war on the part of the British. After two campaigns Abdurrahman Khan was established on the Afghan throne by British arms. (See *Afghanistan.*) The viceroys of late date include Lord Ripon, 1880; Lord Dufferin, 1884; Marquis of Lansdowne, 1888; George N. Curzon, 1896; Lord Minto, 1905; Lord Hardinge, 1910. Within recent years there has been serious unrest among the people of India, with symptoms of widespread native revolt against British control, and the government is facing a possible revolutionary movement in favor of independence.

India Matting, a matting woven from the stems of *Papyrus Pangorei* or *corymbosus*, and chiefly exported from Bengal.

Indiana (in-di-an'a), one of the United States, bounded by Michigan lake and state, Ohio, Kentucky, and Illinois. It is almost one continued plain, with the exception of the hills of the Ohio River and Wabash valleys, which rise from 200 to 600 feet above the sea-level, the highest elevation being 1250 feet. The western side of the state, north of the Wabash, is mostly prairie land interspersed with lakes, woodlands, and swamps. The eastern part was originally thickly covered with forests, which, however, are rapidly disappearing before the settler. The soil varies from a deep black sand to clay loam and is generally fertile, nearly one-eighth of the area being open prairie and well adapted to agriculture. Indian corn, wheat, oats, barley, tobacco, and potatoes are the chief agricultural products. Molasses, cider, wine, honey, cheese, milk, are also plentifully produced. Immense herds of cattle and swine are reared. Between the Wabash and the Ohio there is a coalfield of nearly 7000 square miles, with coal of excellent quality, and an output which in 1910 amounted to about 12,000,000 tons. Adjoining the coal measures are quarries of building stone covering 200 square miles. The other chief mineral products include petroleum, natural gas, limestone and sandstone. The natural gas product is one of the largest in the world, though it is showing signs of exhaustion. Petroleum also yields a large product. The manufacturing industries are in a flourishing state, woolens, cottons, lumber, agricultural implements, manufactures of iron, paper, and leather, being the leading industries. The Ohio, White River, Wabash, and the Miami are the principal rivers. A canal 467 miles in length, from Evansville to Toledo, unites the Ohio, the Wabash, and Lake Erie. The railroads have a length of more than 6000 miles. The principal towns are Indianapolis (the capital), Evansville, Fort Wayne, Terre Haute, New Albany, Lafayette, South Bend, Madison, etc. Indiana was part of the territory ceded by the French to the British in 1763, and by the British to the United States in 1783. It was erected into a State in 1816. Area of the State, 36,354 square miles. Population, 2,700,876.

Indiana, a borough, capital of Indiana Co., Pennsylvania, 40 miles W. N. W. of Altoona. It has an extensive trade, also large glass works, tanneries, flour, saw and planing mills, etc. There is here a State Normal School. Pop. 5749.

Indianapolis (in-di-an-ap'ō-lis), a city, capital of Indiana, lies on the White River, near the center of the state, mostly situated on a plain It is the center of numerous railroads, and being surrounded by rich agricultural and mineral regions is a place of great trade and manufactures. It is an important market for grain, live stock, timber, etc., and carries on pork packing, the production of iron goods of various kinds, agricultural implements, woolens, flour, etc. The city is well and regularly built, the chief edifice being the new statehouse. Educational and benevolent institutions are numerous, the former including a university, medical and other colleges. Pop. 233,650.

INDIANA
Scale of Miles
0 5 10 20 30 40 50
Longitude 86° 30′ West from 86° Greenwich
Lake Michigan
Michigan City
Chicago
Gary
Hammond
Whiting
East Chicago
Porter
Valparaiso
Laporte
Michigan
Indiana
Ohio
Kentucky
Illinois
Terre Haute
Lafayette
Logansport
Elkhart
South Bend
Mishawaka
Fort Wayne
Richmond
Anderson
Muncie
Marion
Kokomo
Peru
Wabash
Huntington
Indianapolis
Columbus
Bloomington
Evansville
New Albany
Jeffersonville
Madison
Lawrenceburg
Aurora
Rising Sun
Vincennes
Princeton
Mt. Carmel
Lawrenceville
Olney
Robinson
Marshall
Danville
Crawfordsville
Frankfort
Elwood
Alexandria
Greenfield
Shelbyville
Seymour
Columbus
Hartford City
Portland
Winchester
Spartanburg
Union City
New Paris
Greensburg
Rushville
Connersville
Centerville
Cambridge City
Liberty
Nulltown
Laurel
Metamora
Hamilton
Cincinnati
Oldenburg
St. Leon
Brookville
Clarksburg
Charlestown
Sellersburg
Utica
Corydon
Georgetown
Lanesville
Mauckport
Tell City
Cannelton
Rockport
Grandview
Troy
Derby
Newburgh
Boonville
Mt. Vernon
Evansville
Henderson
Owensville
Princeton
Oakland City
Winslow
Jasper
Huntingburg
Ferdinand
Dubois
Youngerscreek
Pekin
Palmyra
Bridgeport
Milltown
Salem
Henryville
Memphis
Underwood
Scottsburg
Austin
Crothersville
Medora
Vallonia
Brownstown
Seymour
Hayden
Columbus
Hope
Edinburg
Taylorsville
Flatrock
Hartsville
Burney
Westport
Napoleon
Osgood
Versailles
Dillsboro
Aurora
Lawrenceburg
Moores Hill
Milan
Delaware
Sunman
Spades
New Alsace
Manchester
Oldenburg
Brookville
Hamilton
Cincinnati
Vevay
Madison
Hanover
Chelsea
Nabb
Lexington
Bethlehem
Marysville
Otisco
Owen
Mt. Sterling
McGregor
Patriot
Aaron
Enterprise
Middle Fk
Gaff
Oleam
Rising Sun
East
Dupont
Paris Crossing
Retreat
Chestnut
Ewing
Shields
Norman
Heltonville
Bedford
Orleans
Paoli
Hardinsburg
Leavenworth
Tobinport
Corydon Jc.
Tower
Marengo
Tarwell
Birdseye
Leopold
Celina
Fredonia
Kings Creek
New Amsterdam
Dongwood
Magnet
Madrid
St. Meinrad
Gentryville
Elberfeld
Tennyson
Lynnville
Dale
Ferdinando
Buckskin
Ft. Branch
Cynthiana
Poseyville
New Harmony
Griffin
Stewartsville
Haubstadt
Francisco
Hazleton
Otwell
Ireland
Winslow
Jasper
St. Anthony
Eckerty
English
Milltown
Palmyra
Bridgeport
Pekin
Youngerscreek
Dubois
Haysville
Hudsonville
Reeve
Yenne
Chambersburg
Salem
Henryville
Memphis
Underwood
Scottsburg
Austin
Crothersville
Medora
Vallonia
Brownstown
Seymour
Hayden
Columbus
Hope
Edinburg
Taylorsville
Flatrock
Hartsville
Burney
Westport
Napoleon
Osgood
Versailles
Dillsboro
Aurora
Lawrenceburg
Moores Hill
Milan
Delaware
Sunman
Spades
New Alsace
Manchester
Oldenburg
Brookville
Hamilton
Cincinnati
Vevay
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Chelsea
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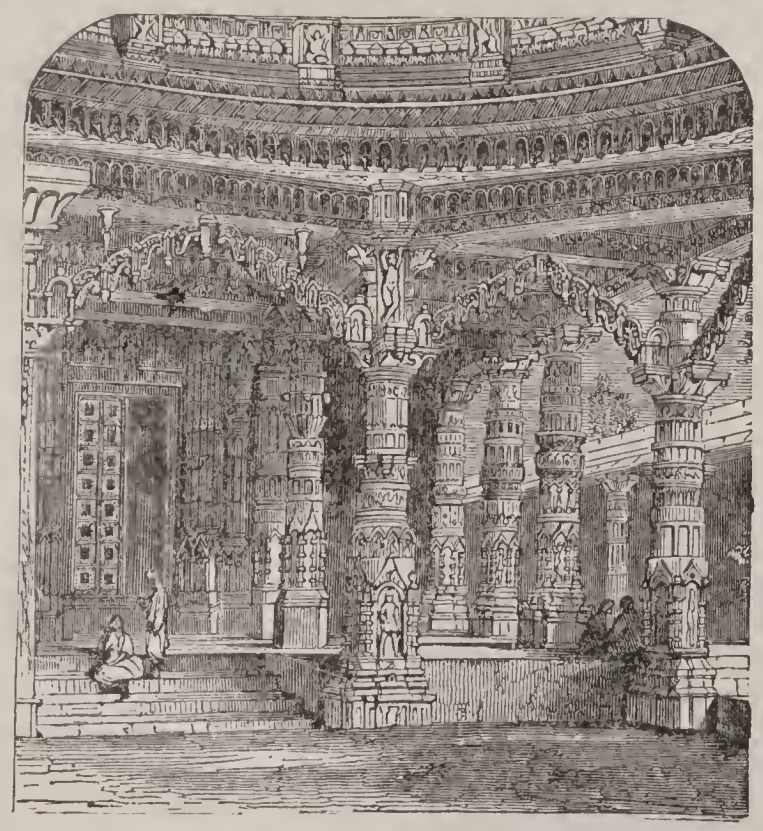
Manchester
Oldenburg
Brookville
Hamilton
Cincinnati
Vevay
Madison
Hanover
Chelsea
Nabb
Lexington
Bethlehem
Marysville
Otisco
Owen
Mt. Sterling
McGregor
Patriot
Aaron
Enterprise
Middle Fk
Gaff
Oleam
Rising Sun
East
Dupont
Paris Crossing
Retreat
Chestnut
Ewing
Shields
Norman
Heltonville
Bedford
Orleans
Paoli
Hardinsburg

Indian Archipelago. See *Malay Archipelago.*

Indian Architecture, comprehends a great variety of styles, among which we may dis-

Buddhist Great Tope at Sanchi, Central India.

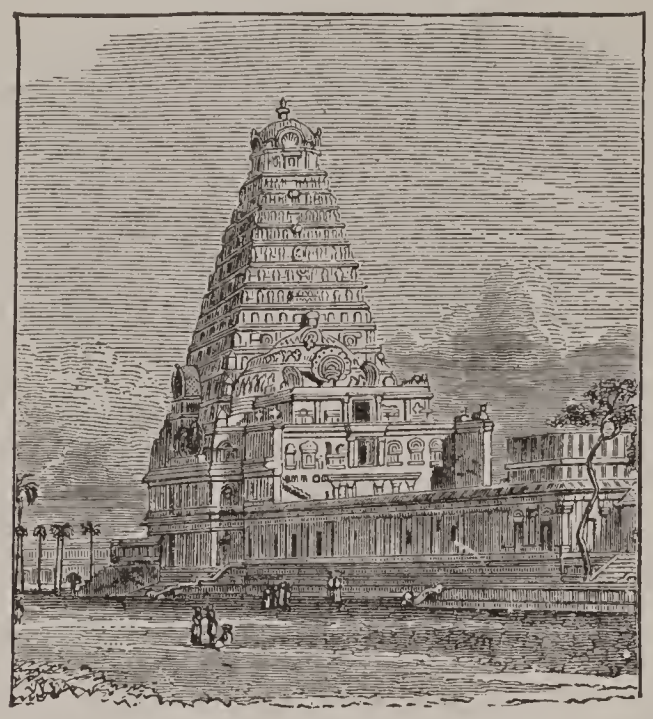
tinguish, as the most important, the Buddhist style, the Jaina style, the Dravidian or style of Southern India, the Chalukyan style, the Modern Hindu or Indian-Saracenic style. The history of Indian architecture commences in the third century B.C., with the religious buildings and monuments of the Buddhists. Among the principal forms of BUDDHIST ARCHITECTURE are the following:—First, the *topes*, *stupas*, or towers built to mark some sacred spot, and the *dagobas*, constructions of a similar nature, containing relics of Buddha or Buddhist saints. These buildings generally consisted of a circular stone basement varying from 10 or 12 to 40 feet in height, and from 40 to 120 feet in diameter, on which rose a rounded domical structure, generally of brick or small stones laid in mud, the whole edifice rising sometimes 50, sometimes 100 feet high. (See *Dagoba, Tope.*) Second, the rock-cut *chaitya halls* or churches, and the *viharis* or monasteries. Most of these are found in the Bombay Presidency; some also in Bengal and Behar. In rock-cut buildings architectural skill is confined to the façade and the interior, which are generally cut out with most beautiful and perfect detail. Among the most notable for beauty of design are those at Ajanta, and finest and largest of all, the great Chaitya cave at Karli, near Bombay, the date of which is probably about 80 B.C. Another interesting example is at Ellora (which see). The JAINA STYLE is a development or corruption of the pure Buddhist. It is characterized by the square or polygonal court, the twelve-pillared dome, the slenderness and elegance of the columns, the horizontal arch, the *sikras* or towers surmounting the cells containing the images, and, lastly, by the peculiar grouping of many temples together on hilltops. Prominent examples of Jaina architecture are found at Girnar in Gujerat; and at Mount Abu, of the Aravulli range. The DRAVIDIAN STYLE is that of the peoples of Southern India. Its most flourishing epoch comprises the sixteenth, seventeenth, and even eighteenth centuries of our era. To this late period belong the great temples at Tanjore, Tiruvalur, etc. The distinctive parts of a Dravidian temple are the *vimana* or temple proper, with storied pyramidal roof; the *mantapas* or porches, covering the door which leads to the cell; the *gopuras* or gate-pyramids, in the quadrangular enclosures surrounding the vimanas; the *choultries* or pillared halls, used for various purposes. The general characteristics of a Dravidian temple of the first class are the storied pyramidal towers, the hall of 1000 columns, the bold cornice with double flexure, the detached shafts, the richly-carved stylobate,



Vimala Sah Jain Temple, Mount Abu—Jaina style.

and the large tanks with flights of stone steps. The CHALUKYAN STYLE, so named from a dynasty which rose in the sixth century, in what is now Mysore and the

Nizam's Territory, reached its perfection in Mysore from eleventh to fourteenth centuries. The characteristic features are the open porch, the straight-lined, conical-



The Great Pagoda, Tanjore—Dravidian style.

shaped tower, the star-shaped temple, and the basement terrace of stone. The INDIAN-SARACENIC STYLE is a general name for a number of somewhat varying styles, the result of the mixture of Saracenic principles of architecture, brought with them by the Mohammedan conquerors of India, and the distinctive architectural features of the different localities where they settled. Under the Mogul emperors in the sixteenth century were erected some most magnificent buildings, such as the tomb of Humayun Shah at Old Delhi; that of Akbar at Secundra (see *Akbar*); the palaces of Shah Jehan at Agra and Delhi; and the famous and most beautiful Taj Mahal, built by the same monarch at Agra. The Moslem architecture of India contrasts with the native Indian styles in its use of the radiating arch, in the superior simplicity and grandeur of its style—its flat ornamentation not interfering with the lines of true architectural construction. A characteristic feature also is its fine conventionalism of vegetable forms for decoration and tracery. See *Saracenic Architecture*.

Indian-bay, *Laurus indica.* See *Laurel.*

Indian-berry, *Cocculus indicus.* See *Cocculus.*

Indian-cedar. See *Deodar.*

Indian Corn. See *Maize.*

Indian Fig, a name given to the *Opuntia Tuna* and *O. ficus-indica*, and other species of the Cactus family common in the tropical and sub-tropical countries of America, and now naturalized in Africa, Asia, and Southern Europe. They are generally from 10 to 12 feet high. Their fruit, which is egg-shaped and from 2 to 3 inches long, is cooling and wholesome, and yields a juice used for coloring confectionery. The wood of the stems becomes very hard with age.

Indian Hemp, same as *Canada Hemp* (which see).

Indian Ink, a practically indelible writing ink of which there are two principal kinds—one prepared in Italy, Turkey, and Asia from certain cuttle-fishes, the other in China by fixing fine lamp-black with glue or size and a little camphor. The former when submitted to the action of an alkali becomes brown sepia.

Indian Mutiny. See *India* (*History*).

Indian Oak, a popular name for the teak-tree (which see).

Indian Ocean, that great body of water which has Asia on the north, the Sunda Isles and Australia on the east, Africa on the west, and the Antarctic Ocean on the south. The Cape of Good Hope and the southern extremity of Tasmania may be considered its extreme southern limits on the

Exterior of the Chaitya Cave, Ajanta—Buddhist style.

FAMOUS INDIAN CHIEFS

Upper left, **MATO-WOPA-GEYA** or **Charging Bear,** Siouan-Yankton Tribe. Upper right, **AQUQAR-ENUTS** or **Cross Feathers**, Algonquin-Cheyenne (Southern) Tribe. Lower left, **WAWIEKUMIG** or **The Round Earth,** Algonquin-Chippewa Tribe. Lower right, **HOOSHTOGL** or **Tom Hill,** Shahaptian-Nez Perce Tribe.

west and east. Its length from north to south somewhat exceeds 6500 miles, its breadth varies from 6000 to 4000 miles. It is traversed by the equatorial current flowing east to west, and its navigation by sailing vessels is more or less modified by the periodic trade-winds and monsoons. Its greatest known depth is 3080 fathoms.

Indian Paper, a paper made from the bark of *Daphne cannabina*, native to India, China, and Japan. It is generally used in India on account of its toughness, durability, and exemption from the attacks of insects.

Indians (in'di-anz), AMERICAN, the collective name given to the tribes inhabiting the continent at the time of the discovery by Columbus, and to such of their descendants as still survive. The name of Indians was first given to these races from the notion that the newly-discovered continent formed part of India. The Eskimo or Innuit, the most northerly of these tribes, extends across the continent along the Polar Sea. South of these are the allied Kenai and Athabascan groups, the former represented chiefly by the Yellow Knife or Atna tribe on the Yukon River. The Athabascans are chiefly found between Hudson's Bay and the Rocky Mountains, but include also the Coppermine, Dogrib, and Beaver Indians; the Tlatskanai, Unkwa, and Hoopah Indians of the Oregon coast; the Navajo tribe of the Highlands of New Mexico; the Apaches, ranging from western Colorado to Chihuahua and Coahuila; and the Lipani, north of the mouth of the Rio Grande del Norte. Canada and the United States east of the Mississippi were formerly inhabited by the Algonquin-Lenape and the Iroquois, generally at war with each other. The extreme west of the Algonquin region was occupied by the Blackfeet Indians; the Ojibeways, or Chippewas, held the shores of Lake Superior; south and west of Hudson's Bay were the Crees. The Leni-Lenape section of the Algonquin-Lenape group comprised the five nations of the Delawares, including the Mohicans. The Iroquois included the Senecas, Cayugas, Onondagas, Oneidas, and Mohawks, who formed a league of five nations, afterwards joined by the Tuscaroras. The Hurons were of the Iroquois group. The Dacotah or Sioux group occupied the plains between the Rocky Mountains and the Mississippi as far south as Arkansas, and included the Assiniboins, Winnepegs, Iowas, Omahas, Osages, Kansas, Arkansas, Menitarees, Crows, and Mandans. West of the Mississippi also were the Pawnees and Riccaras about the Nebraska or Platte River, and to the southeast were the Choctaws and Chickasaws. In the Rocky Mountain regions were the Shoshone or Snake Indians, including the Comanches and others. The Cherokee tribes, which inhabited South and North Carolina, the Creeks and Seminoles of Georgia and Florida, formed a detached group, and the Texas Indians were comprised in many small and diverse tribes. Below these, in New Mexico, a more advanced and distinct family is found called Moquis or Pueblo Indians, and westward the Apaches and various other tribes. Of the numerous families occupying Mexico the Nahuatls or Aztecs were the most powerful and civilized. The Otomis, speaking a peculiar language, were also a numerous people in Mexico. In Central America the predominating family was the Maya, including the Quichés, Kachiquels, etc. Portions of the Aztec tribes were also found in Central America. In South America the leading and more advanced families were those that made up the Peruvian Empire, among which the Inca race and the Aymaras were the chief. The Araucanians, to the south of these, in Chile, had a considerable resemblance to the Algonquins and Iroquois of North America. The remaining portions of South America, including the great alluvial tracts of the Atlantic slope, were principally occupied by the Guaranis; but along its northern coast were found the Caribs, who spread also over the Antilles and most of the West Indian Islands. In the extreme southern part of the continent live the tall Patagonians or Tehuelches, and squalid families in some respects resembling the more debased Australians.

By some ethnologists the American Indians are considered an aboriginal and single stock; by others a mixture of Mongolian, Polynesian, and Caucasian types; and by others as derived from the grafting of Old World races on a true American race. They are generally characterized as having long, black, and straight hair, scanty beard, heavy brows, receding forehead, dull and sleepy eyes, a salient and dilated nose, full and compressed lips, and the face broad across the cheeks, which are prominent, but less angular than in the Mongolian. The facial angle is about 75° (about 5° less than the European average); the hands and feet are small and well proportioned. The complexion varies from dark-brown to almost white; a somewhat reddish tint is common. The North American Indian is described as of haughty demeanor, taciturn and stoical; cunning, brave, and often ferocious in war; his temperament

poetic and imaginative, and his simple eloquence of great dignity and beauty. The Mexico-Peruvians worshiped the sun with human sacrifices and the grossest rites. Those of the United States and Canada believe in the two antagonistic principles of good and evil, and have a general belief in manitous, or spiritual beings, one of them being spoken of as the *Gitche Manitou*, or Great Spirit. They believe in the transmigration of the soul into other men and into animals, and in demons, witchcraft, and magic. They believe in life after death, where the spirit is surrounded with the pleasures of the 'happy hunting grounds,' though they have no idea that the acts of their present life can have any connection with their future happiness. They adopt a *totem* or symbol of the name of the progenitor of the family; this is generally some animal (the turtle, bear, and wolf being favorites), which is the mark of families even when expanded into tribes. No marriage rite is necessary beyond the consent of the parties and their parents; but the wife may be dismissed for trifling causes, and polygamy is allowed. In ancient times the body was covered with furs and skins according to the seasons, but now the white man's clothes and blanket have generally superseded the native dress; though the moccasin of deer or moose hide, and in the wilder tribes the ornamental leggings and headdresses are largely retained. Their dwellings are made of bark, skins, and mattings of their own making, stretched on poles fixed in the ground. Their arms consist of the bow and arrow, the spear, tomahawk, and club, to which have been added the gun and knife of the whites. Canoes are made of logs hollowed out, or of birch bark stretched over a light frame, skilfully fastened with deers' sinews, and rendered water-tight by pitch. The Indians of the United States, however, are now largely gathered into reservations and their former dress, arms and habits are being changed for those of the whites. Civilization is invading them and driving out their older characteristics. This is especially the case with the large numbers now dwelling in the former Indian territory, now Oklahoma. The antiquities found in Mexico and Peru, and the ruins of elaborate buildings in Central America, prove that the semi-civilized races there existing had made considerable progress in sculpture and architecture. The number of Indians in the British possessions is about 130,000, in the United States (1910), 265,683, in Central America 1,500,000, and in Mexico 4,000,000, in all North America somewhere about 6,000,000. In South America their number is probably about 10,000,000, many of them being more or less civilized and professing Christianity.

Indian Shot (*Canna indica*), an ornamental plant of the Arrow-root family, found in most tropical countries. The seeds are round, hard, and black, hence the name of Indian shot applied to the plant.

Indian Summer, the name given to a period of mild summer weather which generally occurs towards the end of autumn in North America, usually in November.

Indian Territory, See *Oklahoma.*

Indian Yellow, or PUREE, a pigment of a bright yellow color, but not permanent; used in water-color painting. It is composed of the phosphate of urea and lime, and is imported from India.

India Paper, a name originally given to a very light, absorbent buff paper made by hand in China. The use of the word 'India' was probably due to the tendency to give that name to anything originating in the East. Its first use was in printing very fine engravings, which were therefore commonly called 'India proofs.' The original India paper was introduced into Europe in 1841, where tests showing its great strength and durability created wide interest among paper manufacturers, who thereupon undertook to duplicate it. The term is now used to describe an extremely light, thin paper, very tough and opaque, made principally in England, Germany, Italy, France, Holland and Belgium, and used especially in printing Bibles, but also frequently in other books where it is desirable to reduce their bulk and weight, without affecting their durability, or necessitating smaller type.

India paper is essentially a rag paper, no mechanical wood pulp being used. The opaque character is due to the large percentage of mineral matter remaining in the fiber. Even more important than the materials used is the great skill and care exercised throughout the processes of manufacture to retain the mineral matter.

India Rubber, a peculiar elastic substance composed of carbon and hydrogen, found in suspension in the milky juice of many different families of plants. (See *Caoutchouc.*) The crude rubber is usually prepared where the juice is collected, by drying the juice over a fire in the sun on moulds of clay, paddles, or lasts; by evaporating the juice in the sun and removing the

successive pellicles formed on the surface; or by coagulating the juice, as in Nicaragua, by an application of the juice of the bejuca vine, and kneading and rolling the coagulated mass. Most of the rubber of commerce is derived from Brazil and the Andes states of South America, also from Central America, Mexico, etc.; smaller quantities from Java, Penang, Singapore, Assam, and South Africa. The purest comes from Pará, Brazil, in large bottles and thick plates. Prior to the introduction of rubber into Europe, in the early part of the eighteenth century, it had already been turned to various domestic and industrial uses, such as the making of bottles, syringes, boots, and waterproofing, by the natives and residents along the banks of the Amazon. In Europe the first important practical applications of it are associated with the names of Mackintosh, the patentee in 1823 of a waterproofing process by the solution of the gum in oil of turpentine and alcohol and in coal-tar naphtha, and Handcock, the inventor of the 'masticator,' a machine for the condensation of crude lumps or shreds of caoutchouc, as imported, into compact homogeneous blocks for subsequent division into cakes, sheets, rollers, etc. Its great modern utility, however, is due to the American inventor, Charles Goodyear, the inventor of the vulcanizing process, in which rubber is hardened by the addition of sulphur, patented in 1844. Since then its uses have multiplied so rapidly that it is employed in every department of industry. Thus apart from its use in blocks and sheets, etc., in tapes or threads for weaving into elastic tissues, and as varnish for waterproofing, it is employed, in combination with other resinous materials in a solvent such as naphtha, as a cement or marine glue. When combined with a small quantity of sulphur, etc., it is used for the manufacture of overshoes, boots, gloves, life-preservers, gas-bags, steam and water packing, belting, fire-hose, tubing, springs, tires, artificial sponges, etc. With a larger proportion of sulphur, and cured or vulcanized by exposure to a high temperature, it is used for the manufacture of combs, pen and pencil holders, rulers, inkstands, buttons, canes, syringes, jewelry, and, when colored with vermilion, for mountings for artificial teeth, etc. In combination with asphalts, oils, and sulphur, etc., and vulcanized (*kerite*) it is used for covering telegraph wires. A new field for its use has lately developed in the large automobile tires, the rapid progress of the automobile industry having so greatly increased the demand as to bear heavily on the sources of supply and considerably increase the market value of rubber. The insufficient supply has led to active search for new sources and the development of existing sources, especially that of Mexico, which has become one of the greatest rubber producers. Lazaculapa district, Chiapas, is the largest in the world, with 7,000,000 trees and an output of 100,000 lbs. The export from Brazil in 1910 was 38,953 tons, of which 17,071 came to the United States. The Palo Amarillo tree and the Guayule shrub of Mexico yield rubber in addition to the regular rubber tree, and rubber-yielding plants have been found elsewhere, as in Mozambique and Africa south of the Zambezi, where is a thick vine called the laudolphia, which yields this product.

Indicative (in-dik'a-tiv), that mood of the verb in which something is said positively; hence it has also been called the positive mood, as distinguished from the subjunctive and potential.

Indicator (in-di-kā'tur), (1) an instrument for ascertaining and recording the pressure of steam in the cylinder of a steam-engine, in contradistinction to the steam-gauge, which shows the pressure of the steam in the boiler. (2) An apparatus or appliance in a telegraph for giving signals or on which messages are recorded, as the dial and index hand of the alphabetic telegraph. (3) A genus of African birds, the honey-guides or honey-guide cuckoos. See *Honey-guide.*

Indic Languages, the class of Indo-European (Aryan) languages comprising the dialects at present spoken in India, as Hindi, Hindustani, Mahratti, Bengali, and the dead languages Prakrit, Pali, and Sanskrit.

Indiction (in-dik'shun), in chronology, a period or cycle of fifteen years, supposed to relate to some judicial acts, probably the publication of tariffs of the taxes which took place at stated intervals under the Greek emperors. Three sorts of indiction are mentioned:—(1) the Cæsarean, which fell on the 8th of the calends of October, or 24th of September; (2) the indiction of Constantinople (beginning A.D. 312), on the 1st of September; and (3) the pontifical or Roman, which begins on the calends of January. We find ancient charters in England dated by indictions.

Indictment (indīt'ment), in law, a written accusation of one or more persons for a crime or misdemeanor, preferred to and presented

upon oath by a grand jury to a court. Indictments must have a precise and sufficient certainty.

Indigestion (in-di-jest'yun). See *Dyspepsia.*

Indigirka (en-dye-ger'kȧ), a river of Eastern Siberia, flowing northwards into the Arctic Ocean; length 750 miles.

Indigo (in'di-gō), a blue vegetable dye, extensively employed in dyeing and calico-printing; an important commercial product in the East and West Indies, Mexico, Brazil, Egypt, etc. It is chiefly obtained from various leguminous plants of the genus *Indigofĕra*, herbaceous or shrubby plants, with pinnate leaves, and small, blue, purple, or white

Indigo-plant (*Indigofera tinctoria*).

pea-shaped flowers disposed in axillary racemes. They are very numerous in the equatorial regions of the globe. The species most commonly cultivated are the *I. Anil*, a native of Tropical America, but now cultivated also in the East Indies; the *I. tinctoria*, also cultivated in both Indies; and the *I. cærulea*. The *I. tinctoria* is the species most abundantly cultivated. The greater part of the indigo used at the present day comes from India, especially from the provinces of Bengal, Oude, and Madras. The ground is ploughed towards the end of the year, and the seed sowed in the early spring of the following year. The first cutting of the plants takes place about midsummer, and the second about two months later, the process of extracting the dye varying as the leaves are fresh or dried. Indigo occurs in the market in pieces which are sometimes cubical, sometimes of an irregular form; these pieces are easily broken, the fracture being dull and earthy. The color varies from light-blue to blackish-blue; when rubbed with the nail a copper-colored streak is formed on the surface of the mass. Indigo is insoluble in water, but when exposed to the action of certain deoxidizing agents it becomes soluble in alkaline solutions, losing its blue color and forming a green solution from which, when precipitated by acids, it becomes white, but it instantly becomes blue on exposure to the air. Commercial indigo contains about 50 to 60 per cent. of pure indigo blue, the remainder consisting of substances called indigo gluten, indigo yellow, indigo red, etc. Artificial indigo is now produced by chemical processes, having been discovered in 1878. This has come into use sufficiently to diminish the demand for the natural product, and is said to be superior to the latter in color and wearing powers.

Indigo-bird, a North American bird (*Cyanospiza cyanea*) of the finch family. It is of a deep-blue color, and is a good songster.

Indigo-copper, the native protosulphide of copper, of an indigo-blue color.

Indigofera (in-di-gof'e-ra), a large genus of plants, nat. order Leguminosæ, including about 220 species, indigenous in the warmer parts of Asia, Africa and America. See *Indigo.*

Indigometer (in-di-gom'e-tėr), an instrument for ascertaining the depth of color of indigo.

Indium (in'di-um), a metal discovered by Reich and Richter in 1863 by means of spectroscopic analysis in the zinc-blende of Freiburg. It has been isolated in small quantities, and is of a silver-white color, soft, and marks paper like lead; specific gravity, 7.421 at 16°.8. The metal is related to cadmium and zinc, and its spectrum exhibits two characteristic lines, one violet and another blue.

Indo-China, the name now given to the southeastern peninsula of Asia, comprising Burmah, Siam, Cambodia, Cochin-China, Tonquin, Anam, etc. It was formerly known as Farther India.

Indo-European Languages, also called ARYAN or INDO-GERMANIC, the most important of the great families into which human speech has been divided, spoken by various peoples in Asia and Europe. The chief branches of this family are the Teutonic or Germanic, including English, German, Dutch, Danish, Swedish, Icelandic, and the extinct Gothic; the Slavonic (Polish, Russian, Bohemian); the Lithuanian; the Celtic (Welsh, Irish, Gaelic, Breton); the Latin or Italic, and the Romance tongues descended from it (French, Italian, Spanish, Portuguese); the Greek, the Armenian, the Persian, and the Sanskrit. All these tongues are regarded as being descended from a common ancestral tongue or parent speech, spoken at some remote period in the original home of the Aryans. This home has been variously located in Central Asia, Scandi-

navia, Caucasia, etc., by different writers. See *Philology*.

Indore, or INDOR (in-dōr′), a protected native state of Hindustan, connected with Central India, and consisting of several detached portions, the largest being bisected by the Narbada; total area, 8400 sq. miles. It forms the remnant of the sovereignty of the Mahratta dynasty of Holkar, and Holkar as the family name is associated with the title Maharajah, which belongs to the ruler of the state. It is traversed by the Vindhya Mountains, and much of the country is well wooded. Indore is generally fertile, the cultivated crops including wheat, rice, millet, cotton, sugar-cane, oil-seeds, tobacco, and opium, which is one of the principal products. Among the inhabitants are numerous Bheels. The ruling class are Mahrattas. The Holkar dynasty was founded by Mulhar Rao about the middle of the eighteenth century. Their dominions were at one period much more extended than at present. Pop. about 850,690.—INDORE, the capital, is of modern origin, and in recent times has rapidly increased. The Maharajah's palace is the most conspicuous edifice. The British residency is one of the handsomest in Hindustan. Pop. 86,686.

Indorsement (in-dors′ment), or ENDORSEMENT. See *Bill*.

Indra (in′dra), a Hindu deity, originally representing the sky or heavens, and worshiped in the Vedic period as the supreme god, though he

Indra.—Coleman's Hindu Mythology.

afterwards assumed a subordinate place in the Pantheon. He is commonly represented with four arms and hands riding on an elephant. When painted he is covered with eyes. He is at once beneficent as giving rain and shade, and awful and powerful in storm as wielding the thunderbolt. In one aspect he is lord of *Swarga*, the beautiful paradise where the inferior gods and pious men dwell in full and uninterrupted sensuous felicity.

Indre (aṇdr), a department of Central France; area, 2666 square miles. It belongs to the basin of the Loire, which receives its waters by the Indre, a river of 140 miles length, the Creuse, and the Cher. The department is generally flat, and nearly two-thirds of the surface is arable. Large crops of wheat and barley are produced; other important crops are hemp and flax. A considerable quantity of land is occupied by vineyards. The minerals include iron, lithographic stones, and several varieties of marble. The principal manufactures are fine woolen cloth, and iron and steel goods, linen, hosiery, etc.. Châteauroux is the capital. Pop. 290,216.

Indre-et-Loire (aṇdr-ė-lwär), a department of Central France; area, 2377 square miles. It belongs to the basin of the Loire, and is traversed both by it and its tributary the Indre, as also by the still more important tributaries the Vienne and the Creuse, besides the Cher. They are all navigable within the department, and furnish it with almost unlimited means of water communication. The surface is finely diversified, and more than one-half is arable. Hemp and flax are extensively cultivated, and fruit is very abundant. Iron is worked to some extent; and there are valuable millstone quarries. Clay, both for ordinary purposes and the finer kinds of pottery, is abundant. The manufactures are not of much importance. Tours is the capital. Pop. 337,916.

Induced Current (in-dūst′), the current of electricity which is produced or excited in a conductor when the magnetic field in which it is placed is altered in any way; that is, 1st, when the strength of the current in a neighboring conductor is altered; or 2d, when a neighboring conductor in which a current flows is altered in position; or 3d, when a neighboring magnet is moved; or 4th, when the magnetization of a neighboring magnet is altered. Thus, if there is a closed circuit, say a coil of wire with its ends joined, through which no current is passing, the motion of a magnet in its neighborhood will induce a current in it, the direction of this current being always such as to oppose the motion.

Induction (in-duk′shun), in logic, is that process of reasoning by which we rise from the particular to the general, and is the counter-process to deduction. In induction particulars

are not only raised into generals, but these into still higher generalities. In following this method we proceed from the known to the unknown, and obtain a conclusion much wider than the premises. Thus a person who has had any experience easily arrives by induction at the conclusion that fire burns wood, and when any piece of wood whatever is presented to him he will have no hesitation in saying that fire will burn it. As it is impossible that all particulars can be observed, there is always a certain risk of error, and the inductive method must be worked with extreme caution; but science properly so called would be impossible if we did not presuppose a faculty of arriving from experience at the knowledge of truths not contained in that experience. Hence the ground of induction is the established fact that nature is uniform.

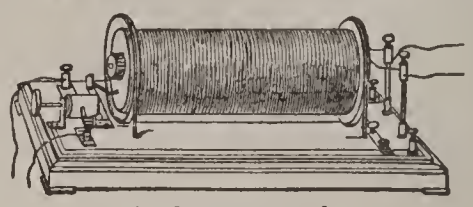
Induction, in English ecclesiatical law, the investing of a clerk presented to a benefice with the temporalities thereof. The person inducting takes the clerk by the hand, and lays it on the ring, key, or latch of the church-door or wall of the church; or he delivers a clod, turf, or twig of the glebe, and thus gives corporal possession of the church. The doors are then opened, the clerk put into the church, and the bell tolled to make the induction known. The incumbent must assent to the Thirty-nine Articles and the Book of Common Prayer, and take the oath of allegiance. In Scotland the minister is inducted by the presbytery.

Induction, Electromagnetic, the action by which a current of electricity is produced in a conductor when the magnetic field in which it is placed is altered in any way. See *Induced Current.*

Induction, Electrostatic, the action by which the distribution of a charge of electricity on a conductor is altered by the approach of an electrified body. When a body charged with one kind of electricity is approached towards an insulated conductor which originally had no charge, a charge similar to that of the influencing body is produced on the remote side, and an equal charge of the opposite kind on the near side of the insulated conductor. It is to the mutual induction between the two coatings, one charged positively, that the Leyden-jar is indebted for its large electrical capacity.

Induction, Magnetic, the action by which iron and other substances become magnetic when in a magnetic field, that is, when in the neighborhood of magnets or currents of electricity. See *Electro-magnetism, Magnetism.*

Induction-coil, an instrument invented by Ruhmkorff, in which rapid breaking and making of the current of electricity in a primary short coil of wire gives rise to a succession of induced currents (see *Induced Current*) of very great electro-



Induction-coil.

motive force in a long secondary coil. Such a coil often consists of a copper wire many miles in length, and a succession of powerful sparks passes between its terminals when the primary current is rapidly made and broken.

Indulgence (in-dul'jens), in the Roman Catholic system is the remission granted by the church to a repentant sinner of the temporal punishment due to his sin, whether this punishment be the pains of purgatory, or penance which the church has the right to impose according to the gravity of the sin. It must be understood that the indulgence is never to be considered as constituting a remission of the sin itself. The principle of indulgences rests on that of good works. Many saints and pious men have done more good works and suffered more than was required for the remission of their sins; these are known as *works of supererogation*, and the sum of this surplus constitutes a treasure for the church, which is under the control of the pope, who is privileged to make use of it as he finds advisable in exchange for pious works. Indulgences are of two kinds: *plenary*, when considered an equivalent substitute for all penance; and *partial*, when only a portion of penitential works is relaxed. *Local* indulgences are attached to particular places, *real* indulgences to various good works. The historic origin of indulgences is traced to the public penances and the canonical punishments which the early Christian church imposed on offenders, especially on those who were guilty of any grievous crime, such as apostasy, murder, and adultery. When ecclesiastical discipline became milder it was allowed to commute these punishments into fines for the benefit of the church. The first recorded instance of the use of the name indulgence was by Alexander II in the

eleventh century, but the institution itself was in full development during the Crusades. At first the only source of indulgences was in Rome, and they could be obtained only by going there. The supposititious abuse of granting indulgences inflamed the zeal of Luther, and the Protestant theologians have always found indulgences one of the most assailable points of the Roman Catholic system.

Indus (in'dus), the chief river of the northwest of Hindustan. It has a length of about 1800 miles, drains an area of about 370,000 square miles, and rises in Tibet on the north of the Himálaya Mountains. At first it flows in a northwesterly direction, but after bursting through the Himálayas flows southwest till it enters the Indian Ocean. At Attock it is joined by the Kabul from Afghanistan, and here, 950 feet above the sea, it is nearly 800 feet wide, and from 30 to 60 feet deep according to the season. Near Mittankot it receives on the east the Panjnad, or united stream of the 'Five Rivers' of the Punjab. In Sind it gives off several extensive arms or canals, which are of great value for irrigation; and below Haidarabad it divides into a number of mouths. Its delta extends about 130 miles along the coast. Vessels drawing more than 7 feet cannot generally enter any of its mouths; but steamers of light draught ascend from Haidarabad to Multan.

Industrial and Provident Societies, societies that carry on some trade for the mutual benefit of the members. In Great Britain various acts have been passed for the regulation of such societies, the most important being in 1876, amending and consolidating all previous acts. The Societies which may be registered under this act are societies for carrying on any labor, trade, or handicraft, whether wholesale or retail, of which societies no member other than a society registered under this act shall have or claim an interest in the funds over £200. No society can be registered which has a membership of less than seven persons; and every society must have a registered office; must publish its name outside the office and elsewhere; must submit its accounts to an annual public audit; must send annual returns to the registrar, etc. A register of its members' names must be properly kept. The registrar, on application of one-fifth of the members, may, with the consent of the treasurer, appoint one or more inspectors to examine into the affairs of the society and report thereon. Societies of this kind have made no progress in the United States.

Industrial Exhibition. See *Exhibition.*

Industrial Schools are schools or institutions devoted to the partial upbringing of vagrant, disorderly, and destitute children, and to which they may be sent by order of a magistrate. The boys are taught shoemaking, tailoring, brush and box making, and various other occupations. The girls learn sewing, knitting, netting, etc. By an act passed in 1866 in Britain any child under the age of fourteen found begging or receiving alms, and not having any home or proper guardianship, or having a surviving parent undergoing penal servitude or imprisonment, or frequenting the company of reputed thieves, may be sent to a certified industrial school. Children under twelve, charged with offenses punishable with imprisonment, but who have not been previously convicted of felony, may also be dealt with in a similar way under the act. Similar institutions exist in some of the American States and there is a growing interest in their results.

Inebriety (in-e-brī'e-ti), habitual or chronic drunkenness. See *Drunkenness, Delirium Tremens, Intoxication, Dipsomania.*

Inertia (in-ėr'shi-à), or VIS INERTIÆ (Lat. the 'power of inactivity'), the passiveness of matter, or its indifference to rest or motion. Newton's first law treats of this property, in virtue of which a body at rest will remain at rest, and a body in motion will continue to move in a straight line and with a uniform velocity unless some force acts upon it.

Inez de Castro. See *Castro.*

Infallibility (in-fal-i-bil'i-ti), exemption from the possibility of error in regard to matters of both faith and morals—a claim made by the Roman Catholic Church both on its own behalf and on that of the pope when speaking *ex cathedrâ* or in his official capacity. The infallibility of the church is of two kinds, *active* and *passive;* the former signifying the function of the church of permanently teaching the truths of God, and of authoritatively settling doctrinal disputes; and the latter that property inherent in the church in virtue of which she can never receive or embrace erroneous doctrine. The infallibility of the pope, long taught, was only settled as an article of faith in the Vatican Council of 1870. The dogma was

then formulated in the following terms: —'We teach and define that it is a dogma divinely revealed; that the Roman pontiff, when he speaks *ex cathedrâ*—that is, when in discharge of the office of pastor and doctor of all Christians, by virtue of his supreme apostolic authority, he defines a doctrine regarding faith or morals to be held by the universal church, by the divine assistance promised to him in blessed Peter—is possessed of that infallibility with which the Divine Redeemer willed that His church should be endowed for defining doctrines regarding faith or morals, and that, therefore, such definitions of the Roman pontiff are irreformable of themselves, and not from the consent of the church.' A considerable body who refuse to accept the infallibility of the pope as one of the dogmas of the church, have formed themselves into a separate church calling themselves Old Catholics. See *Old Catholics.*

Infant (in'fant), a term in the English and American law for persons who have not attained their *majority*, that is, the age of twenty-one years, and under guardianship. In general, contracts made by infants are not binding, except for necessaries suited to their state in life. Being an infant is no bar to criminal proceedings; but young persons are not punished for offences if they have not knowledge and discretion to distinguish them to be such. Infants require the consent of parents or guardians to marry. The jurisdiction in respect to infants is generally vested in either probate or orphans' courts. These courts appoint guardians to take charge of the property of infants, and, in case of the decease of the father, to take charge of their persons; but during the life of the father he has the guardianship and control of the persons of his children until they are twenty-one years of age.

Infante (in-fän'tā), or INFANT (from Lat. *infans*, child), the title given in Spain and Portugal to the princes of the royal house. The princesses are called *infanta.*

Infanticide (infan'ti-sīd), the murder of an infant, a crime that is especially common in the case of illegitimate children, the main cause being shame; but infanticide is sometimes the result of puerperal insanity. In trial for infanticide it must be proved that the child was born fully alive. Infanticide was prevalent in Greece and Rome. In modern times many barbarous nations are guilty of wholesale child-murder. Among the South Sea Islanders and aboriginal Australians the destruction of infant life is systematized. The Hindus destroy female children without compunction, and abortion is common among the Mohammedans. In China, also, infanticide is supposed to be frightfully common.

Infantry (in'fan-tri), foot-soldiers collectively. Except among semibarbarous nations, and during the prevalence of the institutions of chivalry, infantry has always been considered the most important military arm, and this has been peculiarly the case since the formation of standing armies, and since war has become a science. Infantry may be divided into various classes, and most commonly into light infantry and infantry of the line. The light infantry is particularly intended to serve in the outposts, to act as sharp-shooters, and to harass and annoy the enemy. Under equal circumstances well-trained infantry is almost universally successful against any other kind of troops.

Infant Schools, schools the object of which is to amuse, interest, and instruct children from their third to their sixth year. Jean Frédéric Oberlin, Protestant pastor of Waldbach, in Alsace, is regarded as their founder. In 1812 Robert Owen established one at New Lanark, in Scotland, the first attempt of the kind in Great Britain. A second attempt was set on foot in Westminster in 1819, of which Samuel Wilderspin (1792-1866) was one of the first teachers. In Germany there are numerous *Kleinkinderschulen*, or *Kindergärten;* in France, under the name of 'Asylums,' they are widespread; and the *Kindergärten* system (founded about 1840) is acquiring high credit both in Great Britain and in the United States. In dealing with infants of tender years a frequent mistake of teachers is to attempt too much. Physical more than intellectual development should be aimed at; the moral faculties should be trained by an enlightened, judicious, and sympathetic teacher. The school should be a playground, and elementary instruction should be simple, pleasing, and as much as possible imparted by means of models, pictures, and simultaneous singing.

Infection (in-fek'shun), a term sometimes used to signify the communication of disease through the atmosphere, as contrasted with *contagion* (*con*, and *tango*, to touch), communication of disease through the medium of touch. In many cases infection and contagion are used as synonymous. Some diseases may spread in both manners.

Infectious Diseases. See *Contagion.*

Infernal Machines (in-fêr'nal), contrivances made to resemble some harmless object, yet filled with a dangerous explosive. They are arranged to be set off by clockwork, or on opening a box containing the explosive. The bombs of dynamite or other explosive substance now so often thrown or set off by a fuse for the purpose of causing death or destruction of property must be classed in the same category.

Infinite (in'fin-it), a term in metaphysics, which has been the source of much controversy. Some maintain that there corresponds to infinity a distinct notion; while others affirm that the word is a name for a mere negative, that we can never really form any distinct idea of the infinite.

Infinitesimal (in-fin-i-tes'i-mal), in mathematics, an infinitely small quantity, or one which is so small as to be incomparable with any finite quantity whatever, or which is less than any assignable quantity. The *infinitesimal calculus* is a department of the higher mathematics which embraces both the *differential* and the *integral calculus.*

Infinitive (in-fin'i-tiv), the indefinite mood of a verb, or that in which the verb is represented without a subject; the mere name-form of the verb. As the verb expresses an action, or a state, it generally belongs to a subject whose action or state is expressed; but if we wish to express the mere idea of this action or state we use the infinitive, which, therefore, in many languages is employed without further change as a substantive—for instance, in Greek and German—only preceded by the neuter article. The infinitive may be regarded as the point of transition from a verb to a substantive, and is often used as the subject of a proposition.

Infirmary (in-firm'a-ri). See *Hospital.*

Inflammation (in-fla-mā'shun), a vague term for a morbid process, of which the most obvious phenomena are pain, swelling of the affected part, perceptible increase of heat to the patient, and redness beyond the natural degree, often followed by febrile symptoms. Inflammations may arise from external injuries, or may be brought on by morbid or poisonous matters in the system, sudden changes of temperature, etc. The three commonly described terminations of inflammation are *resolution, suppuration* and *mortification* or *sloughing. Resolution* is that recovery from the disorder which is effected without the intervention of any disorganizing process, and when the vessels return to their normal condition on the exciting cause of the disorder being withdrawn, and this is the most favorable mode of termination. If inflammation cannot be resolved it may go on to *suppuration*, when the skin is either divided by the knife or breaks of itself, and there is an escape of a yellow, cream-like fluid, after which the symptoms may abate. The tendency to suppuration is marked by the pain becoming full and throbbing, while the pulse becomes more full without being less frequent. *Mortification* is accompanied by the sudden cessation of pain, and there is the actual death of the part affected. When the circumstances are favorable this dead part sloughs off by a vital process known as *ulceration*, and the cavity gradually fills up and heals. In many cases inflammation may rather be considered as a salutary process than as a disease, for it frequently prevents evils which would occasion either serious or fatal consequences. The most important remedy in cases of severe inflammation is hot fomentations, blisters, bloodletting, the warm bath, combined with low diet and perfect quietude. In the beginning cold is excellent. As to inflammation of the intestines, see *Enteritis;* of the eye, see *Iritis;* of the bowels, see *Peritonitis;* of the brain, see *Meningitis;* of the lungs, see *Pneumonia.*

Inflection (in-flek'shun; Latin, *inflexio,* a bending), in grammar, the changes in form which words undergo in consequence of standing in certain relations to other words in a sentence. These changes occur for the most part at the end of words, and the inflectional elements were all probably at first separate vocables. To inflection belong those changes which comprise cases, numbers, persons, tenses, etc. In some languages we have positive proof of inflections being formed of words originally distinct. Thus Fr. *aimerai,* I shall love, the future of *aimer,* to love, is, literally and historically, I have to love, and is compounded of *aimer,* to love, and *ai,* I have, the first person present indicative of *avoir.* The same is the case in Italian and Spanish. The loss of inflections is a common feature of the Romance tongues as compared with the Latin, on which they are based, and is also a feature of English as compared with Anglo-Saxon. The result in both cases is much less freedom in the arrangement of words, but this is probably counterbalanced by greater perspicuity.

Inflorescence (in-flor'es-ens), in botany, the mode of flowering of any species of plant, that is, the manner in which its blossoms are grouped together, and in some cases in which they are successively open. The

Varieties of Inflorescence.

1, Spike. 2, Amentum or Catkin. 3, Raceme. 4, Panicle. 5, Whorl. 6, Umbel—*a*, simple, *b*, compound. 7, Cyme. 8, Corymb. 9, Thyrsus. 10, Head or Capitulum. 11, Fasciculus or Fascicle. 12, Spadix. 13, Anthodium.

principal forms of inflorescence are the *amentum*, *corymb*, *cyme*, *raceme*, *panicle*, *thyrsus*, *spike whorl* (see those terms); *centrifugal* and *centripetal* are also terms applied to two kinsd of inflorescence.

Influenza (in-flö-en'za; Italian, influence), a term used to denote an epidemic catarrh of a rather severe character, the symptoms of which are those of what is usually called a cold, with others such as lassitude and general depression, loss of sleep, feverishness, nausea, loss of appetite, sometimes vomiting, often an inflammatory state of the throat and pharynx, bronchitis, or other complications. It is not usually fatal, the patient generally recovering in a week or ten days, but it sometimes leaves behind chronic bronchitis or consumption. An infectious form of influenza, known under the name of la grippe, has at intervals spread extensively. An epidemic of it began in the United States about 1890, and since that date it has never quite ceased, occasionally breaking out severely. It is very apt to leave the patient with some organic weakness, the weaker parts of the system seeming the most susceptible to its attacks. Premature exertion after influenza may lead to heart disease, indigestion or damage of the nervous system.

Information (in-for-mā'shun), in law, a complaint or accusation exhibited against a person for some criminal offence. It differs in no respect from an indictment, except that it is filed at the mere discretion of the proper law officer of the government, *ex officio*, without the intervention of a grand jury. The process has not been put in motion by Congress for misdemeanor, but is common in civil prosecutions, for penalties and forfeitures. The information is usually made upon knowledge given by some other person than the officer, called the *relator*. The term also denotes a written statement made on oath before a justice of the peace previous to the issuing of a summons or complaint against a person.

Informer (in-for'mėr), in law, a person who informs or prefers an accusation against another, whom he suspects of the violation of some penal statute. When the informer is entitled to the penalty or part of the penalty, upon the conviction of an offender, he is or he is not a competent witness, according as the statute creating the penalty has or has not made him so. The early legislation in England, granting rewards to informers, gave rise to the most flagrant abuses, and police officers made a trade of seducing poor, ignorant persons to the commission of crimes, especially the issuing of counterfeit money, to gain the reward.

Infusion (in-fū'zhun), a solution of some vegetable substance in hot or cold water, such as are often used for medicinal purposes. The water employed may be at boiling heat, but if the substance is itself boiled the result is a *decoction*. In preparing certain infusions cold water is preferable, as bringing out the constituent desired. The process of making an infusion is much the same as that of making tea.

Infusoria (in-fū-sō'ri-a), a class of minute, mostly microscopic, animals, so named from being frequently developed in organic infusions, provisionally regarded as the highest class of the Protozoa. They are provided with a mouth, are destitute of pseudopodia, but are furnished with vibratile cilia. Most are free-swimming, but some form colonies by budding, and are fixed to a solid object in their adult condition. The body consists of outer transparent cuticle, a layer of firm sarcode called the cortical

layer, and a central mass of semiliquid sarcode which acts as a stomach. A nucleus, having attached to its outside a spherical particle called the nucleolus, is embedded in the cortical layer. Contrac-

MAGNIFIED DROP OF WATER SHOWING INFUSORIA, ETC.

1, Volvox globator (a plant, a low form of Alga). 2, Stentor polymorphus. 3, Urceolaris scyphina. 4, Stylonychia mytilus. 5, Zoöspermos Ferussaci. 6, Trichoda carinum. 7, Monas termo. 8, Pandorina morum. 9, Bursaria truncatella. 10, Vaginicola crystallina. 11, Cercaria gibba. 12, Zoöspermos decumanus. 13, Amphileptus fasciola. 14, Vorticella convallaria. 15, Euptotes truncatus. 16, Trachelocerca olor.

tions of the body are effected by sarcode fibers. The cilia, with which most are furnished, are not only organs of locomotion, but form currents by which food is carried into the mouth. Reproduction takes place variously. They are divided into three orders, Ciliata, Suctoria, and Flagellata, in accordance with the character of their cilia or contractile filaments. Many of the organisms formerly included among Infusoria are now regarded as vegetable.

Ingalls (ing'gâlz), JOHN JAMES, statesman, was born in Middleton, Massachusetts, in 1833. He removed to Atchison, Kansas, in 1858, and was elected to the State Senate in 1862. From 1873 to 1890 he was a United States Senator, and attained a wide reputation as an orator. He was president pro tem. of the Senate during his last three years of service. He died in 1900.

Ingelow (in'je-lō), JEAN, an English poetess, born in 1830; died in 1897. In 1863 she published a volume of poems, which ran through fourteen editions in five years, and her popularity afterward increased both through her prose writings and her poetry. In prose she wrote novels and tales for children, including *Mopsa the Fairy*, *Studies for Stories*, *Off the Skelligs*, *Sarah de Berenger*, *Don John*, etc. Her *High Tide on the Coast of Lincolnshire, 1571*, was her most famous poem.

Ingemann (ing'e-mân), BERNHARD SEVERIN, a Danish poet and novelist, born in 1789; died in 1862. After attaining distinction by his lyric narrative and dramatic poetry he traveled in Germany, France, and Italy in 1818-19, and on his return wrote historical romances (taking Scott as his model) illustrative of the habits of his countrymen during the middle ages; some of these have been translated into English.

Ingersoll (in'ger-sol), ERNEST, naturalist, born at Monroe, Michigan, in 1852. He was employed on the Hayden Survey and the Fish Commission, and wrote a number of works, including *Natural History of Nests and Birds*; *Friends Worth Knowing*; *The Ice Queen*; *Wild Neighbors*, etc.

Ingersoll, ROBERT GREEN, orator, born at Dresden, New York, in 1833. He was admitted to the bar in 1854, soon gained distinction as an orator, and engaged in the Civil war as colonel of a cavalry regiment. He became attorney-general of Illinois in 1866, and in 1876, at the Republican National Convention, made a striking oration in favor of the nomination of James G. Blaine as a candidate for the Presidency. For years he lectured against the Christian doctrines, becoming very popular as a lecturer on this and other subjects, but injuring himself in public estimation. He died in 1899.

Inglis (ing'glz), HENRY DAVID, a miscellaneous writer, born at Edinburgh in 1795; died in London, 1835. His works include *Tales of Ardennes* (1825), *Spain in 1830*, *Ireland in 1834*. Of his fictitious works his *New Gil Blas* is the best. Some of his works appeared under the pseudonym of Derwent Conway.

Ingoldsby, THOMAS. See *Barharm, R. H.*

Ingolstadt (ing'ol-stât), a fortified town of Bavaria, on the Danube, 35 miles S. W. of Ratisbon. It has an old and a new castle, a fine old Gothic church, a Jesuit college, an arsenal, etc.; manufactures of ordnance and gunpowder, breweries, etc. Ingolstadt had a university of some celebrity, founded in 1472, but in 1800 it was removed to Munich. Pop. 22,207.

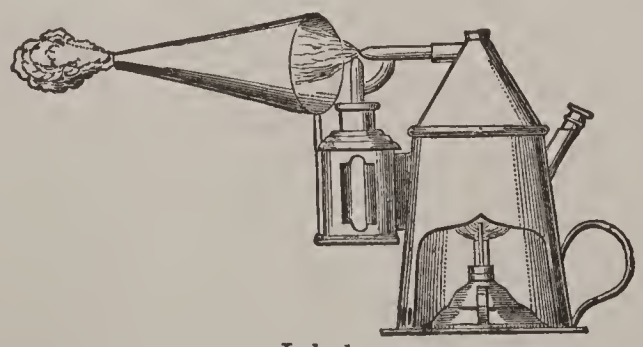
Ingot (ing'got), a small bar of metal made of a certain form and size by casting it in moulds. The term is chiefly applied to the small masses or bars of gold and silver intended either for coining or exportation to foreign countries.

Ingres (aṇ-gr), Jean Dominique Auguste, a French painter, born in 1781. He studied under David. About 1804 he went to Rome, where he resided for fifteen years, and after a further residence of four years in Florence he succeeded Denon in the School of Fine Arts in Paris, his fame being by this time fully established. In 1833 he succeeded Horace Vernet as director of the French Academy at Rome. In 1834 he was nominated Chevalier, and in 1845 commander of the Legion of Honor. In 1855 he received the grand medal of honor at the International Exhibition, and in 1862 he was made a senator and member of the council of public instruction. He died at Paris in 1867. Among the best known of his numerous pictures are *Bonaparte as First Consul*, *Œdipus and the Sphinx*, *Apotheosis of Homer*, painted in the ceiling of one of the apartments of the Louvre; *Birth of Venus*, *Jesus in the Midst of the Doctors*, *Molière in His Study*, *Virgil Reading His Æncid to Augustus*, etc.

Ingria (in'gri-å), a district of Russia, forming a part of the government of St. Petersburg, in which the capital, St. Petersburg, is situated, but at one time belonging to Sweden.

Ingrossing (in-grōs'iṇg), in law. See *Engrossing*.

Ingulphus (in-gul'fus), or Ingulf, Abbot of Croyland, is supposed to have been born in London about 1030. He became a favorite of Edgitha, the wife of Edward the Confessor, who introduced him to William, Duke of Normandy. In 1051 he became his secretary, resigning that office in 1064, when he became a monk in the abbey of Fontenelle, in Normandy, whence he was invited to England by William, and created abbot of the rich monastery of Croyland. He died in 1109. A history of the monastery of Croyland from 664 to 1091 was long attributed to him, but is now believed to



Inhaler.

be a fabrication of the thirteenth or fourteenth century.

Inhaler (in-hā'ler), an apparatus for inhaling vapors and volatile substances, as steam of hot water, vapor of chloroform, iodine, etc. The cut shows an inhaler of improved type. It consists of a tin can containing a small spirit-lamp, and above this a small kettle for hot water, the steam of which is driven out with some force when the apparatus is used. Attached to the can is a receptacle for receiving a small vial containing the substance whose vapor is to be inhaled, this being drawn off and forced through the funnel by the steam.

Inhambane (in-yȧm-bä'nā), a Portuguese town and seaport on the east coast of South Africa, unhealthy, and with little trade.

Inheritance (in-her'i-tans). See *Descent*.

Inia (in'i-a), a genus of Cetacea belonging to the dolphin family, containing only one known species, *I. boliviensis*, remarkable for the distance

Inia boliviensis.

at which it is found from the sea, frequenting the remote tributaries of the river Amazon, and even some of the elevated lakes of Peru. It has bristly hairs on its snout, and is from seven to fourteen feet long.

Initiative and Referendum, a system of legislation by which the people of a State can either initiate measures to be enacted by their own vote into laws, or cause laws enacted by the legislature to be referred to them for approval or rejection. This system prevails in Switzerland and was adopted in South Dakota in 1898, and Oregon in 1902. In the latter State it has been actively applied and with an effect that has led various other States to adopt it, in the form of constitutional amendments. These include Montana in 1906, Oklahoma in 1907, Maine and Missouri in 1908, Arkansas and Colorado in 1910. Several other States have adopted it in partial form, and it is growing in popularity. In no other State, however, is it as far reaching in scope as in Oregon, and nowhere else is it in such active operation. The principle of the Initiative and Referendum has been adopted in many cities which have the commission form of government, as an important aid to its efficiency. To it, in some instances, has been added the Recall, a provision which gives the power

to recall from office any official with whose conduct the public is dissatised. This has been applied in the cases of unsatisfactory mayors of Los Angeles and Seattle. The Constitution of Arizona, formed in 1910, contained provisions for the Initiative, Referendum and Recall, going so far as to make the latter applicable to judges who failed to give satisfaction. This provision was objected to by President Taft and by Congress, and when the constitution was accepted by Congress in 1911, it was with the requirement that this application of the Recall to judges should be eliminated.

Injections (in-jek'shunz), in surgery, fluids, different, according to the different effects desired to be produced, thrown by means of a small syringe into the natural cavities of the body, or those occasioned by disease. Wounds and sores are usually cleansed in this way when they extend far below the skin. In diseases of the nose, the ears, the bladder and urethra, the uterus, etc., injections are often used. Pure warm water is injected with the highest success for the removal of pus, blood, or even foreign bodies. Sometimes astringent medicines, to restrain excessive evacuations, sometimes stimulating ones, sometimes soothing medicaments, to mitigate pain, etc., are added to the water.

Injector (in-jek'tur), an apparatus for supplying water automatically to steam boilers. Feed pumps for feeding water into boilers are difficult to keep in order when driven at high speed, and some form of injector is now in general use in place of high speed pumps. The principle is to permit steam to escape from the boiler into a chamber supplied with water from without, the steam pressure being sufficient to force this water into the boiler through an aperture opening into its lower part. Injectors are in general use in locomotive boilers, in which the steam pump worked only when the engine was in motion, so that if it stood still for any length of time the water in the boiler was apt to get too low. The injector overcomes this deficiency and keeps the boiler constantly supplied with water when it is making steam.

Injunction (in-jungk'shun), a writ which issues under the seal of a court of equity, to restrain proceedings in other courts, or a prohibitory writ restraining a person or persons from doing some act which appears to be against equity, and the commission of which is not punishable by criminal law. Disobedience to an injunction constitutes contempt of court, punishable accordingly. The free use of the injunction power against labor organizations has of late years given rise to much bitter feeling.

Ink, a liquor or pigment used for writing or printing. All ordinary writing inks owe their properties to the presence of gallate or tannate of iron held in suspension by means of gum. Gall-nuts contain gallotannic acid, which gives a black precipitate with per-salts of iron; they also contain pectose, which converts gallotannic acid, when exposed to the air, into gallic acid. This latter acid colors ferric salts a much deeper black than the former acid. The essential points in the preparation of a good writing ink are therefore the presence of an iron salt, an infusion of gall-nuts and gum, and the allowing the mixture to remain for some time exposed to the air. All other substances which are added to ordinary ink as coloring matters in the place of gall-nuts only impair its quality. As ink is liable to become mouldy it is customary to add a small quantity of such substances as essential oils, carbolic acid, crushed cloves, or sometimes corrosive sublimate, in order to prevent this result. For *copying ink* a little sugar is added, which prevents it drying before a copy can be made. The so-called *alizarin inks differ* from ordinary inks in containing a little free acid, and usually also a small quantity of indigo dissolved in sulphuric acid, which prevents too pale an appearance in writing. Such inks become very black by exposure to ammoniacal fumes. Ink is sometimes prepared in cakes or powder, which when dissolved in water may be used as ordinary ink; the thickening ingredients added are usually madder and indigo dissolved in sulphuric acid. Colored writing-inks, as red, blue, etc., are simply solutions of some coloring materials, cochineal and Brazil-wood being used for red, Prussian blue for blue, etc. Gold and silver inks consist of a fine powder of the metals suspended in a solution of gum-arabic.—*Marking ink* usually consists of a solution of silver nitrate thickened with gum and sometimes colored by means of sap-green.—*Printing ink* may be made by boiling linseed-oil and burning it about a minute, and mixing it with lampblack, with an addition of soap and resin. If it be wished to obtain colored printing inks, this may be done by adding the necessary pigments to the oil while it is being heated. Vermilion is used to give a red color, ultramarine for blues, and lead chromate for yellows.—*Lithographic ink,*

used in printing from the stone, is usually composed of virgin wax, dry white soap, tallow or lard, shellac, mastic, and lamp or Paris black.—*Sympathetic inks* have been sometimes used in secret correspondence. They are of various kinds. For instance, characters written in solutions of cobalt, lemon juice, and dilute sulphuric acid make no appearance on the paper, but become visible when treated with some other solution or exposed to the action of heat. See also *Indian Ink.*

Ink-bag, INK-SAC, a bladder-shaped sac found in some dibranchiate cephalopods, as the calamaries or squids, and containing a black viscid fluid resembling ink. This fluid is to some extent used for drawing under the name of sepia.

Inkermann (in-kėr-mȧn′), a town of Russia, government Taurida, in the Crimea, at the head of Sebastopol harbor. It is famous for the signal victory of the allies in the Crimean war over the Russians on November 5, 1854.

Inlaying (in-lā′ing), is the art of ornamenting flat surfaces of one substance by inserting into cavities cut in them pieces of some other substance. Various kinds of metal or wood, or pearl, ivory, etc., are employed in this process. See articles on *Marquetry, Damaskeening, Buhl, Reisnerwork, Pietradura, Bidery, Mosaic.*

Inn, a river of Europe which issues from a lake in Switzerland at the foot of the Rhaetian Alps, traverses the valley of the Engadine, flows through Tyrol and Bavaria, and after forming the boundary for some distance between Bavaria and Austria joins the Danube at Passau, a course of about 300 miles. Its rapid current interferes with navigation.

Inn, a house where travelers are furnished, for the profit of the provider, with everything they have occasion for while on their journey. They may be set up without license by any person, provided he refrains from selling spirituous liquors, which of course require a license. Public houses, taverns, and coffee houses are all inns when the keepers of them make it their business to furnish travelers with food and lodging; otherwise they are not. Innkeepers are bound to take in all travelers and wayfaring persons, and to entertain them if they have accommodation for them (and they are only bound to give such accommodation as they have), at reasonable charges, provided they behave themselves properly. As a protection they have a lien on the goods of their lodgers (with the exception of the clothing which they are actually wearing), so that they may retain them as security for the price of their lodging and entertainment.

Innate Ideas (in′nāt), certain primary notions or impressions, supposed by some philosophers to be given to the mind of man when it first receives its being, and to be brought into the world with it. Descartes distinguished ideas into *innate, adventitious,* and *factitious.* An innate idea he described as not one that presents itself always to our thought, for there could be no such idea; but one that we have within ourselves the faculty of producing. He did not enumerate such ideas, however.

Inness (in′nes), GEORGE, landscape painter, was born at Newburgh, New York, in 1825. No painter has represented the aspects of nature in the American climate with deeper feeling, a finer sentiment of light and color, or a better command of technical resources. His *American Sunset* was selected as a representative work of American art for the Paris Exposition of 1867. He died in 1894.

Innocent (in′u-sent), the name of thirteen popes, of whom only the following need be particularly dealt with:—INNOCENT I, succeeded Anastasius I as Bishop of Rome in 402. He supported St. Chrysostom, and renounced the communion with the Eastern churches on account of their treatment of that eminent man. In 409 he was sent to obtain terms of peace from Alaric, but without success. He died in 417, and is one of the most distinguished saints, his day being July 28.—INNOCENT II, a Roman of noble birth, elected pope in 1130 by a part of the cardinals, while the others elected Peter of Leon, who took the name of Anacletus. Innocent fled to France, where he was acknowledged by Louis VI and by Henry II of England; also by the Emperor Lothaire, who conducted him in 1133 to Rome, where Anacletus also maintained his claims as pope. Innocent was obliged to retire, and though reinstated in 1137 Anacletus maintained himself until his death in 1138. Innocent in 1139 held the second Œcumenical Council in the Lateran, which condemned the opinions of Arnold of Brescia, and declared the decrees of Anacletus null. Innocent died in 1143.—INNOCENT III, Lothario, Count of Segni, born in 1161, was unanimously elected pope at the age of thirty-seven. He displayed great energy, and much enhanced the papal power. He excommunicated Philip Augustus, King of France, and laid his kingdom under an interdict in 1200 because Philip had repudiated his wife, and obliged the king to submit. He extorted a similar submis-

sion from John, king of England, who refused to confirm the election of Langton as Archbishop of Canterbury, by laying the kingdom under an interdict, and in 1212 formally deposing him. Almost all Christendom was now subject to the pope, two Crusades were undertaken at his order, and his influence extended even to Constantinople. The movement against the Albigenses and establishment in 1198 of the inquisitorial tribunals, from which the Inquisition itself originated, were noteworthy events of his pontificate. In 1215 he held a council by which transubstantiation and auricular confession were reaffirmed as dogmas, and the Franciscan and Dominican orders were confirmed. Innocent died in 1216. He left various works on legal and theological subjects; and the *Stabat Mater*, *Veni Sancte Spiritus*, and other sacred hymns, are said to have been written by him.—INNOCENT XI, Benedetto Odescalchi, born in 1611, served in his youth as a soldier, took orders at a later period, and rose through many important posts, until he was elected pope in 1676, on the death of Clement X. He was eminent for probity and austerity. Though hostile to the Jesuits, whose opinions he attacked in the decree *Super quibusdam axiomatis moralibus*, yet he was obliged to condemn Molinus and the Quietists. Being involved in a dispute with Louis XIV, the authority of the pope in France and elsewhere received a severe blow in the *IV Propositiones Cleri Gallicani* (Four Propositions of the Gallican clergy, 1682). These disputes were highly favorable to the English Revolution, as it induced the pope in 1689 to unite with the allies against James II, in order to lower the influence of Louis XIV. He died in 1689, and was succeeded by Alexander VIII.

Innocents, FEAST OF HOLY, variously styled Innocents' Day and Childermas, a festival observed in the Western Church (including the Anglican) on the 28th, and in the Eastern Church on the 29th December, in commemoration of the massacre of the children at Bethlehem by the order of Herod.

Innsbruck (ins'prook), a town of Austria, capital of the Tyrol, beautifully situated on the Inn, near the confluence of the Sill, surrounded by striking groups of lofty mountains. Among the chief buildings are the Hofkirche or Franciscan Church, containing the splendid tomb of the Emperor Maximilian I and the tomb of Hofer; the church of St. James: the imperial castle or palace; the Golden Roof, a sort of oriel window roofed with gilt copper, and projecting in front of a building originally a palace of Count Frederick of Tyrol; the town-house; the Capuchin monastery; the university; and the provincial museum. It has manufactures of textiles, substitutes for coffee, etc. Pop. 26,866.

Inns of Chancery, in London, nine institutions named Thavie's Inn, New Inn, Symond's Inn, Clement's Inn, Clifford's Inn, Staple's Inn, Lyon's Inn, and Barnard's Inn, formerly preparatory colleges for law students.

Inns of Court, four very ancient societies in London exclusively invested with the right to call to the English bar; also the buildings belonging to these societies, in which the members dine and barristers have chambers. The gentlemen belonging to these societies may be divided into benchers, outer barristers, inner barristers, and students. The benchers are the highest in rank, being usually Queen's Counsel, and it is they who have the right of granting or refusing a call to the bar, or of disbarring persons unfit to practise. The four inns of court are the Inner Temple and Middle Temple (formerly the dwelling of the knights templar, and purchased by some professors of law more than three centuries since); Lincoln's Inn and Gray's Inn (anciently belonging to the earls of Lincoln and Gray). Each inn is self-governing, and all have equal privileges. In each inn building there is a hall, chapel, library, etc., besides sets of chambers occupied by barristers and solicitors. Previously to being called to the bar it is necessary to be admitted a member of one of the inns of court and to go through a certain course of legal study and 'keeping terms.' Any person who has passed a public examination at any university in the British dominions may be at once admitted as a student to any of the inns. Every other person must pass an examination in the English and Latin languages and English history before a joint board appointed by the four inns. No solicitor, parliamentary agent, clerk to justice of the peace, or to any barrister, conveyancer, solicitor, etc., can be admitted as a student until such person ceases to act in any of these capacities and has taken his name off the roll of any court on which it may stand. The educational year is divided into three terms. Attendance is not compulsory on students either at lectures or private classes; nor is it essential to study the practice of law in the chambers of a barrister or pleader, though this is recommended. A term is kept by the student being present at six dinners during the term in the hall of the society to which

he belongs, or three if he is a member of one of the British universities. Students are required to pass an examination in Jurisprudence, Roman Civil Law, Constitutional Law and Legal History, the Law of Real and Personal History, Common Law, Equity, and Criminal Law, there being four examinations in each year.

Inoculation (i n - o k-ū-lā'shun), in medicine, the introduction, by a surgical operation, of a minute portion of infective matter into contact with the true skin, for the purpose of exciting artificially a milder form of some contagious disease, and thereby protecting the human system against similar attacks in future; keeping in mind, however, that such a process can be only of efficacy in regard to diseases which attack us only once in the course of our lives, such, for instance, as smallpox. The term is chiefly used in connection with smallpox. The practice of inoculation with material taken from a smallpox patient, long followed in parts of Wales, was seemingly scarcely known throughout England till the early part of the eighteenth century, and its adoption was chiefly due to the exertions of Lady Mary Wortley Montagu, who became acquainted with it in Turkey. For many years the practice met with the greatest opposition, both from the medical profession and the clergy; but later it came extensively in vogue, the smallpox thus induced being of a milder and much less often fatal type than ordinary smallpox. The great objection to it was that it tended to spread this serious disease, inoculated smallpox being equally infectious with the other kind. After the discovery of vaccination by Jenner, in 1798, inoculation was gradually superseded, and the British legislature even prohibited the latter, while making vaccination compulsory. See *Smallpox* and *Vaccination*.

Inosite (in'o-sīt; $C_6H_{12}O_6$), a saccharine substance, isomeric with glucose, found in the muscular substance of the heart, in the lungs, kidneys, brain, etc. In 'Bright's disease' it has been found in the urine, and it exists also in several plants.

Inouye, Kaoru, Count, a Japanese statesman, born in the province of Chosku in 1839. He made a secret journey to Europe with Count Ito, serving as a common sailor on the voyage; and on their return they, at the risk of their lives, advocated the adoption of Western methods. After the restoration, in 1868, he was constantly employed by the government, as minister of public works and foreign secretary. He was raised to the peerage in 1885 and made minister of the interior in 1892.

Inowraclaw (ē-nov-råts'låf), or Jung-Breslau, a town of Prussia, province of Posen. It has large beds of rock-salt and saltpeter-works. Pop. 26,141.

In Partibus Infidelium (literally, 'in parts belonging to infidels'), the title given since the thirteenth century to bishops appointed by the pope in countries where his sway is not recognized, and who, having no proper diocese, take their title from a territory which may have once formed a see, but does no longer; thus Roman Catholic bishops in Britain formerly had such titles as 'Bishop of Nicopolis,' 'Bishop of Anazarba.'

Inquest (in'kwest), See *Coroner*.

Inquisition (in-kwi-si'shun), in the Roman Catholic Church, a court or tribunal established for the examination and punishment of heretics. The institution was founded in the twelfth century by Father Dominic, who was charged by Pope Innocent III with orders to incite Catholic princes and people to oppose heretics. Pope Gregory IX in 1233 completed the design of his predecessors, and the Inquisition was successively introduced into several parts of Italy, and, with certain limitations, into some provinces of France. It never managed to establish itself in England at all. The tribunals of faith were admitted into Spain in the middle of the thirteenth century; but a firm opposition was made to them, particularly in Castile and Leon, and the bishops there maintained their exclusive jurisdiction in spiritual matters. A change, however, afterwards took place; and while in other countries of Europe the Inquisition could never obtain a firm footing—in some falling entirely into disuse, as in France—in Spain it became a political engine towards the end of the fifteenth century, under Ferdinand and Isabella, who used it as a weapon to break the strength of the nobles, and to render the royal authority absolute. In 1477, when several turbulent nobles had been reduced in the southern part of Spain, Queen Isabella went with the Cardinal Pedro Gonzalez de Mendoza to Seville, where this prelate, as Archbishop of Seville, made the first attempt to introduce the Inquisition, especially with regard to citizens of Jewish origin. After this the design was disclosed of extending it over the whole country. In the assembly of the states held at Toledo, 1480, the erection of the new tribunal was urged by the cardinal, and after some oppo-

sition established under the name of the General or Supreme Inquisitor. The new court was opened in Seville in 1481. Torquemada, prior of the Dominican convent at Segovia, and father-confessor to the Cardinal Mendoza, had already been appointed by Ferdinand and Isabella the first grand inquisitor in 1478. The Dominican monastery at Seville soon became insufficient to contain the numerous prisoners, and more than 2000 persons are said to have been burned alive in the first year or two. The pope, however, opposed the establishment of the Spanish Inquisition as the conversion of an ecclesiastical into a secular tribunal, and repeatedly summoned the inquisitor-general to Rome. Torquemada, instead of obeying, sent a friend to defend his cause, and in 1483 Sixtus IV was obliged to yield and acknowledge Torquemada as inquisitor-general of Castile and Leon, and a later bull subjected Aragon, Valencia, and Sicily to the inquisitor-general of Castile. The introduction of the new tribunal was attended with risings and opposition in many places, as at Saragossa, but the people were obliged to yield in the contest. The tribunal was wholly dependent on the Spanish sovereigns, and became a powerful instrument for establishing the arbitrary power of the king on the ruins of the national freedom; for putting down the clergy, who had previously acknowledged only the jurisdiction of the Roman see; and for oppressing the nobles, and taking away the privileges of the estates. The property of those who were condemned fell to the king; and, although it had been granted to the Inquisition, it was still at his disposal. Ferdinand and Isabella, indeed, devoted a part of this property to found convents and hospitals; but the church, notwithstanding, lost many possessions by means of the Inquisition. It is computed that there were in Spain above 20,000 officers of the Inquisition, called *familiars*, who served as spies and informers. These posts were sought even by persons of rank, on account of the great privileges connected with them. The supreme tribunal, under the inquisitor-general, sat at Madrid. He was assisted by a council of six or seven, and there were various officials belonging to the court, the one specially appointed to carry on prosecutions being called the fiscal. As soon as an accuser appeared, and the fiscal had called upon the court to exercise their authority, an order was issued to seize the accused. If he did not appear at the third summons he was excommunicated. From the moment that the prisoner was in the power of the court he was cut off from the world. The advocate who was appointed to defend him could not speak to him except in the presence of the inquisitors. The accused was not confronted with the accuser nor the witnesses before the court, neither were they made known to him; and he was often subjected to the torture to extort a confession, or to explain circumstances which had not been fully explained by the witnesses. Imprisonment, often for life, scourging, and the loss of property, were the punishments to which the penitent was subjected. Wearing the *san-benito*, or vest of penitence,—a sort of coarse yellow tunic, with a cross on the breast and back, and painted over with devils—was a common method of punishment, the penitent having to wear it for a fixed period. When sentence of death was pronounced against the accused the *auto da fe*, or ceremony of burning the heretic in public, was ordered. This usually took place on Sunday, between Trinity Sunday and Advent. As 'the church never pollutes herself with blood,' a servant of the Inquisition, at the close of the procession and ecclesiastical ceremonial preceding the execution of the sentence, gave each of those who had been sentenced a blow with the hand, to signify that the Inquisition had no longer any power over them, and that the victims were abandoned (*relaxados*) to the secular arm. A civil officer, 'who was affectionately charged to treat them kindly and mercifully,' now received the condemned, bound them with chains, and led them to the place of execution. They were then asked in what faith they would die. Those who answered the Catholic were first strangled; the rest were burned alive. Even in more modern times the original organization of the Inquisition was but little changed, but the *auto da fe* was seldom witnessed after the sixteenth century. The powers of the court latterly became more limited, however, by various restrictions, and at last, under Joseph Bonaparte, it was abolished altogether in 1808. It was reëstablished in 1814 by Ferdinand VII, but on the adoption of the constitution of the Cortes, in 1820, it was again abolished. According to the estimate of its historian, Llorente, the number of victims of the Spanish Inquisition from 1481 to 1808 amounted to 341,021, a gross exaggeration, according to Prescott. Of this number, 32,000 were burned.

The Inquisition, abolished for Italy by Napoleon in 1808, restored in Rome by Pius VII in 1814, still exists, nominally at least, as one of the 'congregations.' The censorship of the press was under it.

Insanity (in-san'i-ti), a general term comprising every form of intellectual disorder, whether consisting in a total want or alienation of understanding, as in idiocy, or in the diseased state of one or several of the faculties. Medical writers have adopted different systems of classification in their treatment of this subject; but perhaps the most convenient is that which comprises all mental diseases under the four heads of mania, melancholy, dementia or fatuity, and idiocy. *Idiocy* is either a congenital or an acquired defect of the intellectual faculties. Congenital idiocy may originate from a malformation of the cranium, or of the brain itself. Acquired idiocy proceeds from mechanical injury of the cranium, or from injury or disease of the brain, from excess in sensual indulgences, etc. (See *Idiot.*) *Dementia* is marked confusion of thoughts, loss of memory, childishness, a diminution or loss of the powers of volition, and general weak-mindedness; it differs from idiocy in being curable. *Cretinism*, sometimes given as a separate category, is a form of idiocy associated with a characteristic malformation of the body. *Mania* is a species of mental derangement characterized by the disorder of one or several of the faculties, or by a blind impulse to acts of fury. Adults are the principal subjects. Females are more exposed to it than males. Violent emotions, a dissipated life, excess in any indulgence, sometimes produce it. It is sometimes cured, but sometimes remains stationary, and sometimes is converted into dementia. *Melancholy* is a species of mental disorder consisting in a depression of spirits. Some dark or mournful idea occupies the mind exclusively, so that by degrees it becomes unable to judge rightly of existing circumstances, and the faculties are disturbed in their functions. Several kinds of melancholy are distinguished: the distinctions are founded, however, mostly on the causes of the disease, among the more important of which are love, religious views, repeated failures to reach an earnestly desired end, a sudden nervous shock, and the like. The course of the disease is various; sometimes it lasts a series of years; sometimes it ceases of itself, or is cured by medical aid. Very frequently melancholic patients commit suicide, a tendency that is not to be overlooked. In it also bodily health is likely to be neglected, thus leading to certain other diseases. See *Lunatic Asylum*, *Lunacy*, *Non compos mentis*, etc.

Inscriptions (in-skrip'shuns), ACADEMY OF. See *Institute of France.*

Inscriptions, records, not of the nature of a book, engraved or inscribed on stone, metal, clay, or other durable material. While ancient documents written on papyrus or parchment have largely perished, inscriptions of this kind remain in many cases our sole source of knowledge of long periods of ancient history. Probably more than 150,000 inscriptions have been found of varied character, and an extensive literature has grown up around them. Very many of them are mortuary epitaphs. Far more important are records of events in the history of kings. Some are religious, some are commercial contracts, others mere scribblings on walls, known as graffiti.

Insectivora (in-sek-tiv'u-ra), an order of mammals living to a great extent on insects. They are plantigrade, and have a well-developed clavicle, a discoidal placenta, incisor teeth larger than the canine, and molar teeth set with sharp conical cusps. They are usually of small size, and many of them live underground, hibernating for some months. They are found throughout the world, with the exception of Australia and South America. The chief insectivorous families are the Talpidæ or moles, the Soricidæ or shrew-mice, and the Erinaceidæ or hedgehogs.

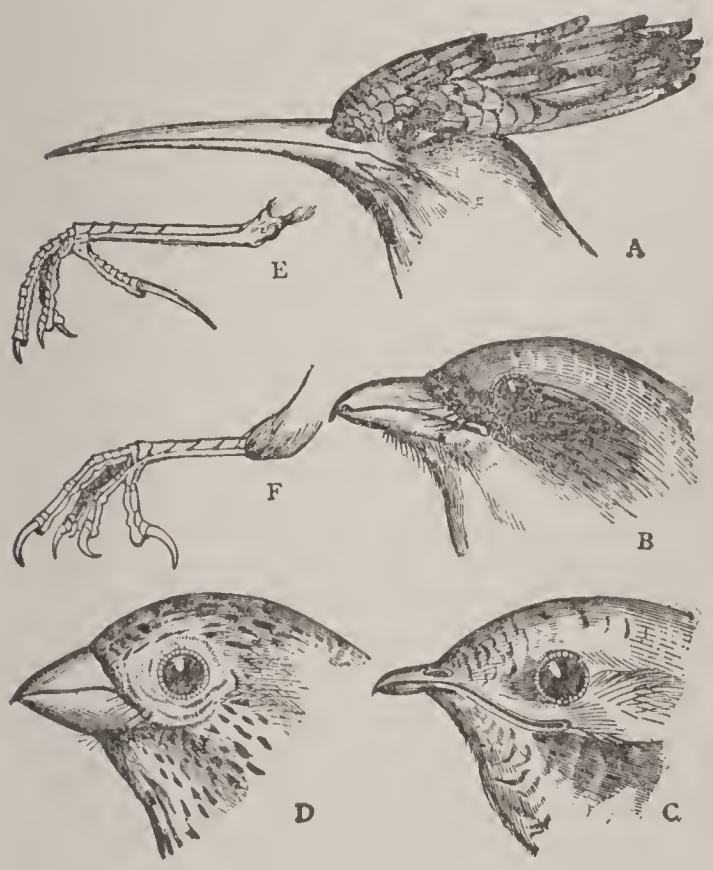
Insectivorous Plants, plants which derive nourishment directly from the bodies of insects entrapped by them in various ways. See *Dionæa*, *Sun-dew*, *Pitcher-plant.*

Insects. See *Entomology.*

Insertion (in-sėr'shun), in botany, the place or mode of attachment of an organ to its support, used especially in regard to the parts of a flower. Insertion is described as *epigynous* when it occurs on the summit of the ovary, as *hypogynous* when beneath the ovary, and *perigynous* when upon the calyx surrounding the ovary.

Insessores (in-se-sō'rēz), in ornithology, the perchers or passerine birds, an extensive order of birds, comprehending all those which live habitually among trees, with the exception of the birds of prey and the climbing birds. The toes, which are three before and one behind, are specially adapted for perching and nest-building. These birds live in pairs, build in trees, and generally display great art in the construction of their nests. In them the organ of the voice attains its utmost complexity, and all our singing birds belong to the order. The form of the beak varies widely, and this has led to the establishment of four

important subordinate groups. (1) The *Conirostres*, or 'conical-beaked' Insessores; (2) The *Dentirostres* or 'tooth-beaked' perchers; (3) The *Tenuirostres*, or slender-beaked perchers; (4) The *Fissirostres*, or cleft-beak (swallows, swifts, goat-suckers, etc.). In modern classifications the Fissirostres are generally excluded from the order, which is also divided otherwise. Two main divisions, the *Acromyodi* or singing-birds and the *Mesomyodi* or songless birds, are now generally recognized, the distinctive characters being based on the structure of the larynx. The former, again, are divided into the *Turdiformes*, or thrush-like birds; the *Fringilliformes*, or finch-like birds; and the *Sturniformes*, or starling-like birds. See also *Ornithology*.



A, Head of Hoopoe (*Upupa epops*), showing the tenuirostral type of beak. B, Head of Red-backed Shrike (*Lanius collurio*), showing the dentirostral type of beak. C, Head of White-bellied Swift (*Cypselus melba*), showing the fissirostral type of beak. D, Head of Corn-bunting (*Emberiza miliaria*), showing the conirostral type of beak. E, Foot of the Yellow Wagtail (*Motacilla sulphurea*). F, Foot of a Finch (*Fringilla*).

Insignia (in-sig'ni-a), the name given to all outward marks of power and dignity, such as the golden crown, the ivory chair, and the twelve lictors with their axes in the time of the Roman kings; the crowns and sceptres of European monarchs; the pallium, the infula, the staff, and ring of the higher orders of the Roman Catholic priesthood. The name of insignia is also applied to the decorations worn by the different orders of merit.

Insolvency (in-solv'en-si). See *Bankrupt*.

Inspiration (in-spi-rā'shun), in theology, is the infusion of ideas into the human mind by the Holy Spirit. By the *inspiration of the Scriptures* is meant the influence of the Holy Spirit exercised on the understandings, imaginations, memories, and other mental faculties of the writers, by means of which they were qualified for communicating to the world divine revelation, or the knowledge of the will of God. Theological writers have enumerated several kinds or degrees of inspiration, which are founded upon the supposition that God imparted to the sacred penmen that measure and degree of assistance which was just suited to the nature of the subjects which they committed to writing, and did not supersede the use of their natural powers and faculties, and of their acquired knowledge, where these were sufficient. Thus distinctions have been drawn between inspiration of direction, inspiration of superintendency, inspiration of elevation, and inspiration of suggestion. All orthodox theologians agree in ascribing divine assistance to the scriptural writers, but differ widely as to the degree, extent, and mode of inspiration. The advocates of *plenary* inspiration assert that every verse of the Bible, every word of it, every syllable, every letter is the direct utterance of the Most High. In opposition to this theory some writers confine inspiration to all that is directly religious in the Bible, to all that is matter of direct revelation, leaving out of the question all that can be known by ordinary intellectual application. Other authorities attribute inspiration only to the spirit, ideas, or doctrines of the Scriptures, exempting the strict form or letter. Some go yet further, and include in the fallible sections the mode of argument and expository details.

Insterburg (ēn'ster-bụrg), a town of Prussia, province of East Prussia, 16 miles west from Gumbinnen, at the confluence of the Angerap and Inster, which here form the Pregel. It has iron-foundries, distilling, brewing, manufactures of linen, leather, and earthenware, etc. Pop. 27,787.

Instinct (in'stinkt), the power by which, independently of all instruction or experience, and without deliberation, animals are directed to do spontaneously whatever is necessary for the preservation of the individual, or the continuation of the kind. Three main

theories have been held with regard to instinctive actions:—(1) That these various impulses and faculties were bestowed by the Creator upon each species as its necessary and characteristic outfit. (2) That instinct is the accumulated results of individual experience, fixed by repetition, and transmitted as an inheritance to succeeding races. In this view instinct is intelligent in its origin, an organized experience, a 'lapsed intelligence.' (3) That the greater number of complex instincts arise through the natural selection of variations of simpler instinctive actions—variations arising from unknown causes. The last theory is that of Darwin.

Institute of France (in-sti-tūt), the principal philosophical and literary society of France, organized after the first storm of the French Revolution in 1795, to replace the Académie Française, the Académie des Sciences, and the Académie des Belles Lettres et Inscriptions, its object being the advancement of the arts and sciences. The Institute now embraces five distinct divisions or *académies*, each having a separate field of knowledge or thought: (1) The *Académie Française*, originally established early in the seventeenth century. Its department is the French language and literature, and its ordinary members number 40. (2) The *Académie des Inscriptions et Belles Lettres;* ordinary members, 40. (3) The *Académie des Sciences;* ordinary members, 65. (4) The *Académie des Beaux Arts;* ordinary members, 40. (5) The *Académie des Sciences, Morales, et Politiques;* ordinary members 40. Each academy has an independent organization and a free disposition of the funds committed to it. Members are elected for life by ballot, and have an annual salary of 1500 francs. To each academy are attached a certain number of honorary members and foreign associates. Admission into the Académie Française is a great object of ambition with most French literary men. The name of this distinguished body was changed in 1848 to *Institut National de France*, having previously been called *National*, *Imperial*, and *Royal* at different times.

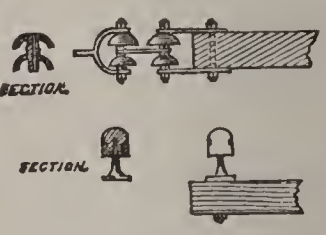
Institute for Medical Research, an important institution founded in New York by John D. Rockefeller, and endowed by him with funds amounting in all to $8.400.000. Its purpose, as at present constituted, is that of research into the causes of obscure diseases, and it seems calculated to prove of immense benefit. A new hospital has been added to it, with 70 beds, to be confined to those suffering from specified diseases which are under special examination by the faculty. At present these are confined to infantile paralysis, pneumonia and heart disease, in order that an exhaustive study of these diseases may be made.

Institutes, a book of elements or principles; particularly a work containing the principles of a system of jurisprudence; as the *Institutes* of Justinian; the *Institutes* of Gaius; Erskine's *Institutes* of the Law of Scotland.

Instrument (in'strö-ment), in music, any mechanical contrivance for the production of musical sound. Musical instruments are divided into three kinds—wind-instruments, stringed instruments, and instruments of percussion. The chief modern stringed instruments are the violin, viola, violoncello, and double bass, the harp, mandolin, guitar, and piano; the chief wind-instruments, the flute, oboe, bassoon, clarinet, basset-horn, serpent horn, trumpet, trombone, ophicleide, and organ; the chief percussion instruments, the drum, tambourine, cymbals, and triangle.

Instrumental Music, music produced by *instruments*, as contradistinguished from *vocal* music. Instrumentation is quite a modern art, and may be said to have been first cultivated to any purpose among the Italians, who up until the middle of eighteenth century, however, used only instruments of the viol kind, and who even yet are sparing in their use of wind instruments. In Italy, Leo, Durante, Jomelli, and Majo; in France, Rameau; in Germany, Haydn and Mozart, deserve the credit of carrying the art to a perfection up to their time undreamed of. Further developments of an important character are due to Berlioz and Wagner.

Insulator (in'sū-lā-tur), a body used to separate an electrified conductor from other bodies, and which offers very great resistance to the passage of electricity. Glass, shellac, resins, sulphur, ebonite, gutta-percha, silk, and baked wood are notable insulating materials. The cut shows the usual forms of insulators in telegraph lines to support the wires on the posts. They are usually made of porcelain or glass.



Insulator.

Insurance (in-shör'ans), is a contract whereby, for a stipulated consideration, called a *premium*,

one party undertakes to indemnify another against certain risks. The party undertaking to make the indemnity is called the *insurer* or *underwriter*, and the one to be indemnified the *assured* or *insured*. The instrument by which the contract is made is denominated a *policy;* the events or causes of loss insured against, *risks* or *perils;* and the thing insured, the *subject* or *insurable interest*. *Marine* insurance relates to property and risks at sea; insurance of property on shore against fire is called *fire* insurance. *Life* insurance, in its widest sense, is a contract entered into by the insurer to pay a certain benefit contingent upon the duration of one or more lives. Besides these classes of insurance there are many others: the traveler may insure himself against loss entailed from damage by rail or sea; the farmer from the inroads of disease among his live stock; the employer from the fraud of a dishonest cashier, etc. Our attention will, however, be confined to the first three divisions.

The practice of marine insurance seems to have long preceded insurances against fire and upon lives, and probably dates from the end of the fourteenth or beginning of the fifteenth century. It is, however, contended, on the authority of Livy, that traces of the practice may be found during the second Punic war, while other writers, founding on a passage of Suetonius, ascribe the introduction of the principle to the Emperor Claudius. Nearer our own day, there are extant rules of sundry guilds or social corporations of the Anglo-Saxons, whereby, in consideration of certain contributions, the members guarantee each other against loss from fire, water, robbery, or other calamity. Insurance, viewed in its commercial aspect, however, seems to have been first undertaken in Flanders. It is probable, from a statement in 43 Eliz. chap. xii, that insurance was introduced into England by the Lombards early in the sixteenth century.

While all fire and life assurances are made at the risk of companies which contain within themselves the requisites of security, wealth, and numbers, a large proportion of marine insurances is made at the risk of individuals called underwriters. The London underwriters form an influential society known as Lloyd's. As a small number of risks would not secure a safe average to the individual insurer, owing to the great hazard property at sea is exposed to, he prudently takes but a fractional part of the entire risk on himself, and this is effected by subscribing or *underwriting* the stipulated proportion on a policy drawn out for the entire sum to be covered. The necessity for circulating the policy and negotiating the insurance has given rise to the business of the *insurance broker*, with which, however, that of the underwriter is frequently combined. Policies are either *valued*, where the insurance is based on a specific bill of lading, or *open*, where in the case of loss, the value of a vessel with her stores is estimated as at the date of sailing, her freight at the amount she would have earned had the voyage been successfully accomplished, and her cargo at its invoice price, adding premium and all charges. The losses against which the insured is not protected are:—1. Acts of the government, such as the destruction of goods in quarantine. 2. Breach of the revenue laws. 3. Consequences of deviation from the terms of the policy. 4. Breaches of the law of nations, such as failure in attempting to run a blockade. 5. Unseaworthiness, or incompetency of the master. 6. Loss arising from unusual protraction of the voyage. 7. Liability for doing damage to other vessels. 8. Average (which see).

Fire insurance is a contract of indemnity by which the insurer, in consideration of a certain premium, undertakes to indemnify against all loss or damage in buildings, stock, goods, etc., by fire during a certain period. Insurances of this nature are hardly ever made by individuals, but almost invariably by corporations and joint-stock companies. Fire insurance has been practised in Britain for nearly two centuries, but was introduced considerably later on the European continent and in America. At an early period after its institution it was considered in Britain a legitimate subject for taxation, the tax, however, being abolished in 1869. No such tax has ever been imposed in the United States. Insurances are generally divided into common, hazardous, and doubly hazardous, the premium increasing with the degree of risk. Nothing can be recovered from the insurers in the event of loss unless the party insuring had an interest or property in the subject insured at the time the insurance was effected and when the fire happened. Sometimes no single office will insure to the required amount; in such a case it is done by different offices. Fire insurance being a contract of indemnity, it is only the actual loss that can be recovered. The premises must not be materially altered, except by arrangement, during the risk, otherwise the policy will be void. The policy will also be vitiated should there be any misrepresentation or omission in the description of the subject insured, and the insurers do not hold themselves liable

for loss or damage by foreign enemy, riot, civil commotion, or military or usurped power.

Life insurance is a much simpler contract in many respects than either of the preceding. There can be but one loss, that caused by death, and therefore there is no partial loss nor average. The rate of 3 per cent. has generally been adopted as a basis for the calculation of premiums. Life insurance companies are divided into three classes. The first consists of corporations or joint-stock companies, who undertake to pay fixed sums upon the death of the party insuring with them; the profits of such societies are wholly divided among the proprietors. The second class is formed on the basis of mutual insurance, the members themselves being the company, and liable to each other for all claims, the profit accruing therefrom being from time to time allotted to the insured, generally in the form of bonuses. The third class, or mixed companies, are proprietary companies charging such increased rates as will yield a bonus, but which, in return for the working expenses and guarantee of their capital, reserve a stipulated portion of their profits for their proprietors. It is impossible to say with certainty which is the preferable form. Life insurance not being a contract of indemnity, a person may insure in as many offices as he likes, and his executors will recover the full amount from each of the insurers. It is legal for a wife to insure her husband's life, as she is dependent upon him for support; or for a husband to insure his wife's if she has an annuity or property settled upon her for life in which he has an interest; or for a creditor to insure his debtor's life. The policy is void where obtained by false representations. Life insurances are often assigned as a security for debt; the assigner binds himself to pay the premiums. Every life insurance company is bound to prepare a yearly statement of its revenue and of its balance-sheet according to prescribed forms, and must cause certain periodical investigations to be made into its affairs, and prepare and furnish to shareholders and policyholders periodical statements of its business. A rigid supervision is exercised by State departments acting under State laws. Full details relative to their business must be rendered annually by the insurance companies, concerning their investments and liabilities, and their sources of income and expenditure.

Intaglio (in-tăl'yō; Ital., from *intagliare* to incise, cut into), a precious stone or gem in which the subject is hollowed out so that an impression from it would present the appearance of a bas-relief.

Interdict (in'tėr-dikt), an ecclesiastical censure in the Roman Catholic Church, the effect of which, taken in its most extended sense, is, that no kind of divine service is celebrated in the place or country under the sentence; the sacraments are not administered, the dead not buried with the rites of the church. This interdict is called *real* or *local*, while the personal interdict regards only one or more persons. Gregory VII, though not the inventor of this engine of ecclesiastical power, used it oftener and more effectively than any of his predecessors. The eleventh century was preëminently the century of interdicts, but they gradually lost power; and when Paul V laid Venice under an interdict in 1606 the churches were not closed nor divine service interrupted, and only a minority of the bishops acknowledged it. The interdict must be announced, like the excommunication, in writing, with the causes, and is not to be imposed until after three admonitions. The penalty of disobedience to an interdict is excommunication. Writers of the Gallican Church say that the pope has no right to lay France under an interdict, and the Parliaments refused to register them. Interdicts are not to be confounded with the simple *cessatio a divinis*, or the disuse of religious ceremonies, which takes place when a church has been polluted, for example, by a murder committed in it.

Interest (in'tėr-est), the allowance made for the loan or retention of a sum of money which is lent for, or becomes due at, a certain time; this allowance being generally estimated at so much per cent. per annum, that is, so much for the use of $100 for a year. The money lent or forborne is called the *principal;* the sum paid for the use of it, the *interest.* The interest of $100 for one year is called the *rate per cent.*, and the sum of any principal and its interest together, the *amount.* Interest is either *simple* or *compound. Simple interest* is that which is allowed upon the principal only, for the whole time of the loan or forbearance. *Compound interest* is that which arises from any sum or principal in a given time by increasing the principal, at fixed periods, by the interest then due, and hence obtaining interest upon both interest and principal. The rate of interest, supposing the security for the principal to be equal, depends obviously upon what may be made by the employment of money in various industrious undertakings, or on the rate of

profit. Where profits are high, interest is high, and *vice versa;* in fact, the rate of interest is simply the net profit on capital. Besides this, however, the interest on each particular loan must further vary according to the supposed risk of the lender, the supposed solvency of the borrower, etc. In Europe formerly the imposition of interest was alternately prohibited and permitted, the clergy being generally unfavorable to the practice. Calvin was among the first to expose the error and impolicy of prohibition. In 1546 it first received a parliamentary sanction in England, and it was fixed at 10 per cent.; in 1624 it was reduced to 8, in 1651 to 6, and in 1724 to 5, at which rate it remained till 1854, when all usury acts were repealed. Similar reductions have taken place in the United States, high rates of interest prevailing in newly settled regions and low ones in the older districts, 5 per cent. being a common rate in the large cities and thickly settled States.

Interference (in-tėr-fēr'ens), in physics, the mutual action of waves of any kind (whether those in water, or sound, heat, or light waves) upon each other, by which, in certain circumstances, the vibrations and their effects are increased, diminished, or neutralized. When two minute pencils of light, radiating from two different luminous points, and making a small angle with each other, fall upon the same spot of a screen or a piece of paper, it is found that in some cases they illuminate the paper or screen more strongly than either would have done singly, and sometimes they destroy each other's effects and produce a black spot or fringe. Such phenomena have been explained in accordance with the undulatory theory of light, and furnish a strong argument in favor of that theory. The interference of waves of sound is a phenomenon which may be frequently observed in the *beat* of the tones of the heavier organ pipes. Again, to a person situated in the middle of a bell the sound waves from the vibrating segments of the bell interfere and produce only a moderate loudness, whereas to a person at a short distance outside the edge the loudness is intolerable.

Interjections (in-tėr-jek'shuns; literally 'things thrown in between'), in grammar isolated words or particles which serve to express any strong feeling or emotion, and which consist for the most part of an exclamation, for example, of astonishment, as *ah!* or *oh!* of pain or lamentation, as *alas!*

Interlaken (in-ter-läk'en; 'between the lakes'), a village in Switzerland, in the canton, and 26 miles S. E. of Berne, beautifully situated near the left bank of the Aar, between the lakes of Thun and Brienz, much resorted to by tourists.

Interlude (in'ter-lūd), originally an entertainment exhibited on the stage between the acts of a play, or between the play and the afterpiece, to amuse the spectators while the actors rested or shifted their dress, or the scenes and decorations were changed. In England dramas appear to have borne this name from the time they superseded the miracle and mystery plays till the period of the Elizabethan drama. The name is also given to a brief piece of church music, prepared or extempore, for the organ, and played after each stanza except the last of a metrical psalm or hymn.

Interment (in-tėr'ment). See *Burial.*

Intermezzo (in-tėr-met'so), in dramatic literature, nearly the same as interlude, a short musical piece, generally of a light sparkling character, played between the parts of a more important work, such as an opera, drama, etc. Pieces intended for independent performances are sometimes designated by this name by the French and the Italians.

Intermittent Fever. See *Ague.*

Internal Revenue, money collected by the United States Government from taxes aside from those on imported goods. The first tax of this kind was laid in 1791 on distilled spirits. Taxes were afterwards laid on carriages and several other articles, and in 1798 a tax of $2,000,000 was apportioned among the States, it being proposed that it should be levied on dwellings, land, and slaves. This was done on account of a threatened war with France. On the recommendation of President Jefferson, all internal taxes were repealed in 1802, and no others were authorized until 1813, when the war with England made an increased revenue necessary. Taxes were laid on a considerable variety of articles, and they were maintained into 1818, for the purpose of paying the debt incurred during the war. After 1818 no such taxes were levied until 1861, when the Civil war rendered an increased revenue necessary. In 1861 a direct tax of $20,000,000 was apportioned among the States, though it was not collected until a year later. On July 1, 1862, an internal revenue act was passed, taxing a great variety of articles, and also incomes, sales, legacies, etc. Many similar taxation acts were passed during the following six years, enormous

revenues being raised, which the exigency of the case induced the people to submit to without opposition. After the war ceased a policy of reduction of taxation was introduced, various acts being passed in 1866, 1867 and 1868, while in 1872 all stamp taxes, except that of two cents on checks, drafts and orders, were abolished. After the latter date reduction went on until internal taxes were restricted to spirits, fermented liquors, tobacco and bank circulation, and by an act of 1886, oleomargarine. During the brief war with Spain, in 1898, special taxes were again levied, but were quickly abolished after the war. At present, in addition to the tax on spirits, fermented liquors, tobacco and oleomargarine, taxes are levied on adulterated butter, filled cheese, opium, mixed flour, playing cards, bank circulation and notes paid out by banks and bankers. A bill taxing corporations was passed by Congress in 1909, which yields many millions of dollars annually to the treasury. An act proposing an amendment to the Constitution permitting the imposition of an income tax has been passed by Congress, but as yet acted on by only a few of the States.

International Arbitration (in-tėr-nash'un-al). See *Arbitration, International.*

International Language. See *Esperanto.*

International Law, the law of nations; those rules or maxims which independent political societies or states observe, or ought to observe, in their conduct towards one another. International law is divisible into two heads, the one which regulates the rights, intercourse, and obligations of nations, as such, with each other; the other, which regulates the rights and obligations more immediately belonging to their respective subjects. Thus the rights and duties of ambassadors belong to that head which respects the nation in its sovereign capacity; and the rights of the subjects of one nation to property situated within the territory of another nation, belong to the latter head. Some of the maxims regarding the rights and duties of nations during a state of peace are:—(1) Every nation is bound to abstain from all interferences with the domains of other nations. (2) All nations have equal and common rights on the high seas, and they are not bound to admit any superiority there. The sea which washes the coast of a nation, to the extent of three miles, is now deemed to be a part of the territory of the nation, over which it may exercise an exclusive jurisdiction. And, in respect to persons subjected to its laws, every nation now claims a right to exercise jurisdiction on the high seas, for the purpose of enforcing both international law, and its own municipal regulations. (3) No nation has a right to pursue any criminal or fugitive from justice in a foreign country; its claim, if any, is a mere right to demand him from the nation in which he has taken refuge. (4) Every nation has a right to regulate its own intercourse and commerce with other nations. (5) Foreigners are bound to obey the laws of a country as long as they reside within it, and under its protection; and the property held by foreigners within a country ought to be protected in the same manner as that of natives. (6) Every nation has a right to send and receive ambassadors and other public ministers; and this right of embassy has always been deemed peculiarly sacred. Their persons are held sacred and inviolable. Their property, their servants and retinue enjoy a like privilege. (See *Ambassador.*) (7) It is through the medium of ambassadors and other public ministers that treaties, conventions, and other compacts between nations are usually negotiated, thus forming a positive code for the regulation of their mutual rights, duties, and interests. In the modern practice of nations such treaties and compacts are not generally deemed final and conclusive until they have been ratified by the respective governments to which the negotiators belong.

War introduces an entirely new order of rules. The right of declaring war results from the right of a nation to preserve its own existence, its own liberties, and its own essential interests. In a state of nature men have a right to employ force in self-defense; and when they enter into society this right is transferred to the government, and is an incident to sovereignty. What are just causes for entering into a war is a question which has been much discussed by publicists. Defensive wars are necessarily justifiable from the fact that they involve the existence of safety of the nation and its interests. But offensive wars are of a very different character, and can be justified only in cases of aggravated wrongs or vital injuries. The first effect of a declaration of war is to put all the subjects of each of the nations in a state of hostility to each other. All the property belonging to each is deemed hostile. If it be personal property it may be captured as prize; if lands, it may be seized and confiscated at the pleasure of

the sovereign; if it be merely in debts or stock it may, in the extreme exercise of the laws of war, be equally liable to confiscation. As soon as a battle is over the conquerors are bound to treat the wounded with kindness, and the prisoners with a decent humanity. And there are some things which seem positively prohibited from their cruelty and brutal barbarity; such are the violation of female captives, the torturing of prisoners, the poisoning of wells, the use of inhuman instruments of war. In time of war there is occasionally an intercourse between the belligerents which should always be held sacred. Thus the interchange of prisoners by cartels; the temporary suspension of hostilities by truces; the passage of flags of truce; the engaging in treaties of capitulation. When any conquest of territory is made the inhabitants pass under the dominion of the conqueror, and are subject to such laws as he chooses to impose upon them. There are also certain rights which war confers on the belligerents in respect to neutrals. Thus they have a right to blockade the ports or besiege the cities of their enemies, and to interdict all trade by neutrals with them. But no blockade is to be recognized unless 'the besieging force can apply its power to every point in the blockaded state.' They have a right also to insist that neutrals shall conduct themselves with good faith, and abstain from all interference in the contest by supplying their enemy with things contraband of war. And hence arises the incidental right of search of ships on the high seas for the detection of contraband goods. A neutral nation is bound to observe entire impartiality between the belligerents. Neutral nations are, strictly speaking, bound to compel their subjects to abstain from every interference in the war, as by carrying contraband goods, serving in the hostile army, furnishing supplies, etc. Subject to the exceptions above referred to, a neutral has a right to insist upon carrying on its ordinary commerce with each of the belligerents in the same manner as in times of peace. Within recent years the scope of international law has greatly widened, as a result of the establishment of The Hague Court of Arbitration and its several sessions. Decisions have been reached binding the nations to a closer consideration of the rights of neutrals during war, and the court, as now constituted, promises to become a great center of development by the principles of international law. See *Neutrality*.

International Society, a social and political organization of the working classes formed in 1862 in London through the combined efforts of representatives of the French socialists, English trades-unionists, extreme radicals, and political refugees of all nationalities. It arose out of the visit of a body of French workmen sent over to England by Napoleon III to visit the exhibition, and to fraternize with their English fellows. Its original purpose was to prevent needless competition among workmen, to regulate strikes, to establish common interests among the working classes in different lands, and generally to amend their condition by all practicable means. At a great meeting in London, in 1864, under the leadership of Karl Marx, Odger (the first president of the society), and others, a more political character was given to it. The conference at Lausanne bore this character still more strongly. The wealth and influence of the society continuing to increase, its aims became more distinctly revolutionary, and the society threw all its influence on the side of the Communists of Paris in the spring of 1871, when many of its leaders perished. As the result of the congress at The Hague, in 1872, the general council split up into two sections; the minority, composed of British, Swiss, Spanish, and Italian representatives, deciding to form a European confederation apart from the extreme section under the leadership of Marx and the French Communists, which then transferred its headquarters from London to New York. Since that time the doings of the society have attracted little public attention.

Internuncio (in-tėr-nun'shi-ō), an envoy of the pope, sent to small states and republics, distinguished from the nuncio who represents the pope at the courts of emperors and kings.

Interpleader (in-tėr-plēd'ėr), in law, the right or process by which a man who is called upon by two opposite parties to pay a sum or deliver over goods, and who is not sure which party is the rightful claimant, can call upon the parties to come forward as against each other, and so relieve him.

Interpolation (in-tėr-pu-lā'shun), a branch of mathematical and physical analysis, treating of the methods by which, when a series of quantities or observations succeeding each other according to some determinate law have been found, others subject to the same law may be interposed between them. Thus, the sun's right ascension being found for every Greenwich noon, its values at any other times may be filled in by interpolation; and similarly

from a series of observed relations between the temperature and pressure of saturated steam, the pressure corresponding to any temperature may be found.

Interstate Commerce Commission. This important body, organized by the Congress of the United States in 1887, is based on a law intended to control and regulate all commerce between the States; one which, in these days of immense freight distribution, has a very wide application. The Commission consists of seven members appointed by the President, each drawing a salary of $10,000 a year, and with wide powers of dealing with all illegal discrimination or oppressive operations of railroads and shippers. Its original purpose was to remove the inequalities of freight and passenger rates, and in this direction drastic action has been taken. The growing evil of free passes, intended as a sort of bribe to legislators and officials, has been removed, the issue of such passes having been restricted by law to postal agents and railroad officials. No reduced rates to special classes of travelers may be granted, except in the case of ministers of the gospel. The systematic discrimination in freight rates, which caused much injustice by favoring large shippers, and injuring small shippers, has been vigorously dealt with, and the discrimination between shipping points embodied in what is known as the 'short haul' and 'long haul' practice has been overcome by recent legislation. This gives the Commission a control over freight handling and over the fixation of rates in general which is bitterly resented by the railway companies, as calculated to work them serious injury. The Commission has brought suit against a number of the giant modern corporations which have apparently engaged in illegal operations, and the result of its activity seems likely to inure to the benefit of the people at large, as protecting them against the oppression of these enormously wealthy corporations.

Interstate Commerce Court. In 1910 Congress passed a bill instituting a court under this title, its purpose being to deal with cases arising under the operations of the Interstate Commerce Commission and expedite all such matters as the fixation of railroad rates, etc., when made the subject of litigation.

Interstellar Ether (in-tėr-stel'-er). See *Luminiferous Ether*.

Interval (in'tėr-val), in music, the distance between two given sounds, or their difference in point of gravity or acuteness. Intervals are *simple* when confined within the octave, and *compound* when they exceed it, and are named according to the distance of the two boundary notes. Thus the interval of a whole tone (CD) is called a second, of a whole tone and a semitone (CE ♭) a minor third, etc. All the intervals of any major scale reckoning up from the key-note are *major*. Intervals a semitone less are *minor*. If they are a semitone greater than major, they are *augmented;* if a semitone less than minor, they are *diminished*. See *Music*.

Intestacy (in-tes'ta-si), in law, the condition of a person who dies without having left any will at all, or having left one not legally valid, or such a will that nobody becomes heir under it. The general principle in the United States and Britain is that the law provides an heir or next of kin if the owner himself has not done so. In the case of a person dying partially intestate, the property not included in the settlement goes to the heir-at-law or next of kin according as it is real or personal estate.

Intestine (in-tes'tin; Lat. *intestinum*, from *intus*, within), the name given to the convoluted membranous tube which extends from the right or pyloric orifice of the stomach to the anus, and which receives the ingested food from the stomach, retains it for a longer or shorter period, mixes it with the bile, pancreatic juice, and intestinal secretions, gives origin to the lacteal or absorbent vessels which take up the chyle and convey it into the current of the blood, and which, lastly, conveys the fæcal or indigestible products from the system. In man it is usually divided into the *small intestine*, which comprehends the duodenum, jejunum, and ileum; and the *large intestine*, comprehending the cæcum, colon, and rectum. Three distinct coats are to be distinguished in the structure of the small intestine; these, named from without inwards, are known

Human Stomach and Intestinal Tube.

a, Stomach.—*b* to *d*, Small Intestine. *b*, Duodenum. *c*, Jejunum with convolutions. *d*, Ileum, with do.—*e* to *g*, Large Intestine. *e*, Cæcum, *ff*, Colon. *g*, Rectum.

as the *serous*, *muscular*, and *mucous* coats. The innermost or mucous coat presents several interesting structures. Among these are the *valvulæ conniventes*, or closely folded transverse plaits of the mucous membrane, the functions of which would appear to be those of serving materially to increase the digestive surface or area of the intestine, and thoroughly mingle the ingesta with the secretions. The surface of the membrane is covered with innumerable fine projections termed *villi*, which give to it almost a velvety texture. Each villus is found under the microscope to be an outstanding process of the mucous membrane, containing internally an artery giving off minute ramifications, a vein by which the venous blood is returned, and, lastly, the lacteal or absorbent vessel. The function of the villi, which are most numerous in the duodenum, is preëminently that of the absorption of the chyle or fluid product of digestion, as a preliminary to its transmission to the current of the blood or circulation. Four varieties of glands are also connected with the small intestine, the first three being named after their respective discoverers, Lieberkühn, Peyer, and Brünner, and the other variety occurring singly—the 'solitary' glands—and in groups—Peyer's patches. The exact functions of these bodies are not well known. The duodenum lies in the epigastric region, and makes three turnings, receiving by a common opening between its first and second flexure the bile-duct and the pancreatic-duct. The conversion of the chyme from the stomach into chyle is thus accomplished in the duodenum. The jejunum, commencing at the left side of the second lumbar vertebra, becomes insensibly and gradually continuous with the ileum, which, terminating the small intestine, becomes continuous with the large intestine in the right iliac fossa, and opens into the *colon*, or first portion of the large intestine, which is divided from the small intestine by the *ileo-cæcal* valve. Below the point at which the ileum opens into the colon we find a short blind sac continuous with the colon, and known as the *cæcum;* and attached to the lower extremity of the cæcum, and communicating with the cæcal cavity, we find a little closed tube, to which the name of *appendix vermiformis* is applied.

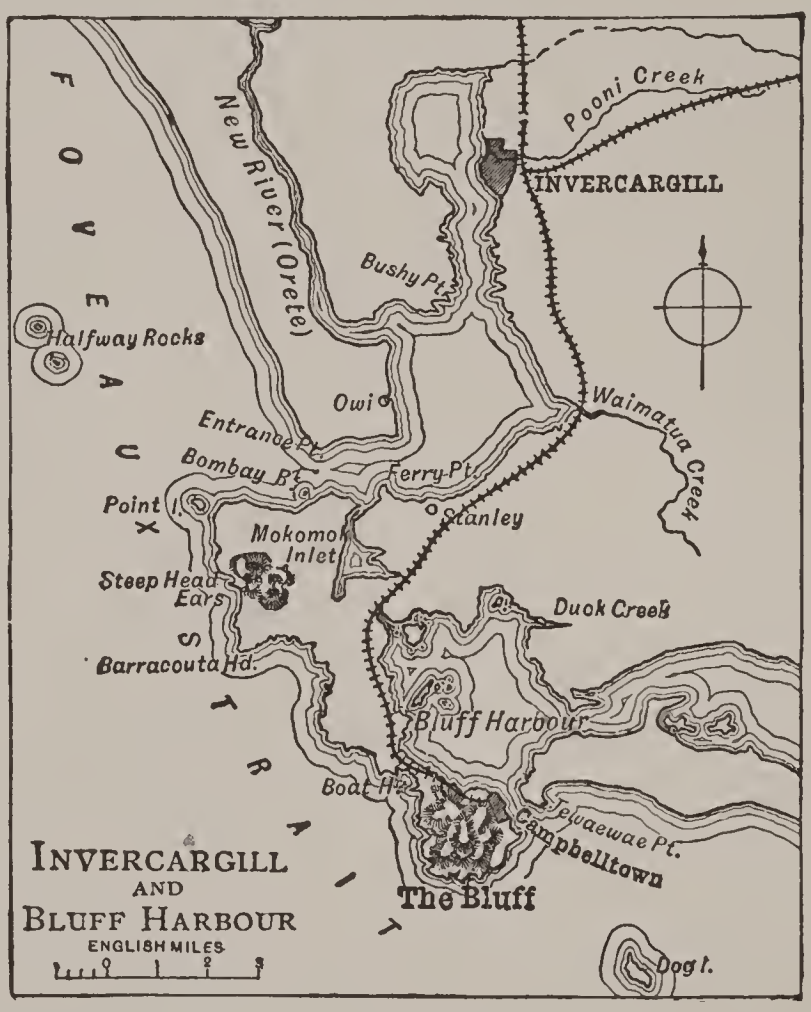
We next find the colon to ascend in the right lumbar region, in front of the kidney. This portion is known as the *ascending colon*. It then crosses the abdominal cavity to the left side, and becomes the *transverse colon;* and finally descends as the *descending colon*, in front of the left kidney into the left groin, where, after making a curve like the letter S—*sigmoid flexure* of the colon—it terminates in the last portion of the intestinal tract. This last portion, known as the *rectum*, finally terminates in the anus. The large intestine measures from 5 to 6 feet in length; the small intestine measures from 16 to about 24 or 26 feet in length; so that the entire intestinal tract may be regarded as being about five or six times the length of the body itself. The three coats of the small intestine are repeated in the large intestine. The mucous or inner coat is not elevated to form villi in the large, as in the small intestine, and only two kinds of glands, the glands of Lieberkühn, and the solitary glands, are to be distinguished in the large intestine. The function of the large intestine is chiefly excretory, but a certain power of absorption is also exercised by its vessels. The food is propelled along the entire intestinal tract by the alternate contraction of the longitudinal and circular muscular fibers, by which means it is gradually pushed along the tube with a *vermicular* or *peristaltic* movement. The ileo-cæcal valve serves to prevent regurgitation of matters into the small intestine after they have passed into the colon. The *mesentery* is the term given to the fold of peritoneum by means of which the small intestines are attached to the spine. The blood-vessels supplying the intestinal tube are the *superior* and *inferior mesenteric arteries* and their branches, derived from the *abdominal aorta*. The veins of the intestines empty their contents into the *vena portæ*, which distributes itself through the liver, and from the blood of which the bile is secreted by the hepatic or liver cells. The nerves of the intestines are derived from the *sympathetic* or *ganglionic system* of nerves, and have also a connection with the eighth cranial nerve—the pneumogastric nerve of the right side.

Intoning, a musical modulation of the voice, differing from chanting chiefly in the fact that in the latter case the cadence is more developed, the divisions more rhythmical, and the music in continuous harmony. The practice prevails in the Greek, Roman, Anglican, and Lutheran churches.

Intoxication, the state produced by the excessive use of alcoholic liquids. In the first stage the circulation of the blood becomes somewhat more rapid, and all the functions of the body and mind are exercised with more freedom. In the second stage the effect on the brain is more decided. The peculiarities of character, the faults of temperament, manifest themselves without

reserve; the secret thoughts are disclosed, and the sense of propriety is lost. In the next degree consciousness is still more weakened; the ideas lose their connection; vertigo, double vision and other discomforts supervene; until finally the excitement partakes of the nature of delirium, and is followed by a more or less prolonged stupor, often by dangerous coma. In cases of extreme intoxication the stomach-pump should be employed, if ordinary emetics fail to overcome the torpor of the stomach. Among the best antidotes are preparations of ammonia and strong infusions of coffee and green tea. The body should be kept warm.

Intrenchment (in-trensh'-ment), any work that fortifies a post against the attack of an enemy. The word is generally used to denote a ditch or trench with a parapet. See *Fortification.*



Introit (in'troit), a psalm or passage of Scripture sung or chanted while the priest proceeds to the altar to celebrate mass; now used for any musical composition designed for opening the church service.

Intuition (in-tū-i'shun), in philosophy, the act by which the mind perceives the agreement or disagreement of two ideas, or the truth of propositions, immediately, or the moment they are presented, without the intervention of other ideas, or without reasoning and deduction.

Intussusception (in-tus-su-sep'-shun), in pathology, the descent of a higher portion of intestine into a lower one: generally of the ileum into the colon. When it takes place downwards, it may be termed *progressive;* when upwards, *retrograde.*—In physiology, the process of nutrition, or the transformation of the components of the blood into the organized substance of the various organs.

Inula (in'ū-la). See *Elecampane.*

Inulin (in'ū-lin; $C_6H_{10}O_5$), a substance analogous to starch, obtained from the dahlia, artichoke, elecampane, potato, and other plants.

Invalides (an-vâ-lēd), Hôtel des, a splendid hospital for disabled soldiers at Paris, in the suburb of St. Germain, erected by Louis XIV between 1670 and 1673. A soldier must have served ten years to be received into this hospital on account of poverty or infirmity. In vaults under the dome lie the remains of Turenne and several other great French commanders, including those of Napoleon I, deposited here December 15, 1840.

Inventory (in'ven-tu-ri), a list containing a short description, together with the values, of goods and chattels, made on various occasions, as on the sale of goods, transfer of movables for pecuniary considerations, decease of a person, etc.

Inveraray (in-vėr-ā'ri), a Scotch royal burgh and seaport, capital of the county of Argyle, beautifully situated near the head of Loch Fyne, 42 miles northwest of Glasgow; having the castle of the Duke of Argyll in the immediate vicinity. Pop. 1369.

Invercargill (in-ver-kâr'gil), a town of New Zealand, county of Southland, province of Otago, situated near the mouth of the New River, about 150 miles S. W. of Dunedin. It is well built, and has an athenæum, hospital, public halls, street tramways, breweries,

foundries, flour-mills, etc. The surrounding district is pastoral and agricultural. It is connected by rail with the port of Campbelltown 17 miles distant, and situated near the entrance to Bluff Harbor. Here there is excellent accommodation for the largest vessels at all times of the tide. Pop. 7299.

Inverness (in-vėr-nes′), a burgh of Scotland, capital of the county of the same name, and chief town in the Highlands. It is beautifully situated, partly on low ground, partly on a gentle acclivity, on both sides of the Ness. The town is well built, among the chief edifices being the county buildings, a fine castellated structure, containing the court-house and jail; the town-hall, the episcopal cathedral, and the Royal Academy. The industries include ship-building, rope-making, tanning, distilling, brewing, etc., and there is a considerable trade. Large vessels unload at the quays. Inverness received a burg charter from William the Lion in the twelfth century. Pop. 21,238.—The county, which is the largest in Scotland, stretches diagonally across the island from sea to sea, and includes on the west the island of Skye, several smaller islands, and all the outer Hebrides, except the north part of Lewis. Area, 4255 square miles, of which a very small portion is under tillage. Great part of the surface is barren heath, useless except for sporting purposes, but a considerable portion is suited for rearing cattle and sheep. The surface generally is mountainous, and presents much fine scenery. Near the southwestern extremity of the Caledonian Canal is Ben Nevis, 4406 feet high, the loftiest mountain in Great Britain. The principal rivers are the Spey, Ness, and Beauly, on all of which there are valuable salmon fisheries. Some of the lakes are of considerable size, and beautifully situated. The largest is Loch Ness, forming part of the Caledonian Canal route. Extensive tracts are held as deer forests, in which the red and roe deer roam at will. The arable and productive land lies chiefly on the sea coast, and on the banks of the lakes and rivers. Gaelic is the prevailing language. Pop. 90,104.

Invertebrata (in-vėr-te-brā′ta), a collective term for the five great lower divisions or sub-kingdoms of the animal series, which agree in not having a vertebral column or backbone, used in contradistinction to the highest group of the animal kingdom, to which the name *Vertebrata* or *Vertebrate* animals is given, all of which possess a vertebral column. In the system of Cuvier the Invertebrata were divided into the *Radiata*, *Articulata*, and *Mollusca*. Succeeding naturalists split up Cuvier's *Radiata* into the sub-kingdoms *Protozoa* (single-celled animals), *Cœlenterata* (sponges and corals), and *Echinodermata* (starfish, etc.). Those with the *Annulosa* (worms), *Arthropoda* (crustaceans, insects, etc.), and *Mollusca* (shellfish), now form the recognized divisions of the Invertebrata. In these no structure analogous to the vertebrate spine is found. Where hard parts exist in them they are generally placed on the outside of the body, and thus constitute an *exoskeleton*, or outer *skelcton*—as opposed to the *endoskeleton*, or internal skeleton of the Vertebrata. The shell of the crab or lobster is a familiar example. The limbs of Vertebrates are never more than four in number, while those of the Invertebrata may be very numerous. Among Vertebrates also reproduction is purely and solely *sexual;* but in Invertebrata *asexual* reproduction is common, many of them reproducing their species by *gemmation* or *budding*, and by *fission*.

Investiture (in-ves′ti-tūr), in the feudal law, was the open delivery of a fee or fief by a lord to his vassal, thus, by external proof, affording evidence of possession; or the formal introduction of a person into some office or dignity. Investiture was often performed by the presentation of some symbol to the person invested, as a branch of a tree, etc. The investiture of persons with ecclesiastical offices or dignities is historically the most important phase of the subject. The estates and honors which composed the ecclesiastical temporalities were considered to partake of the nature of fiefs, and therefore to require similar investiture from the lord. Charlemagne is said to have introduced this practice, and to have invested the newly-consecrated bishop by placing a ring and crosier in his hands. The custom does not appear to have been opposed during the lapse of two centuries from his reign, but the church at last protested strongly against it. Alexander II issued a decree against lay investiture in general. This was revived by Gregory VII (Hildebrand), who, having succeeded in annulling the prerogative of the emperors to nominate or confirm popes, sought to disjoin entirely the ecclesiastical from the civil rule. In 1075 he issued a bull forbidding under penalty of excommunication lay investiture and the enfeoffing of prelates with the ecclesiastical temporalities. Henry IV, emperor of Germany, vigorously resisted the pope, but was (1077) obliged to submit and perform severe penance for his acts of opposition.

The struggle then begun with Henry IV by Gregory was carried on by his successors, and it was not till the papacy of Calixtus II, in 1122, that the question was settled in favor of the pope. By a concordat then arranged at Worms Henry V resigned forever all pretence to invest bishops by the ring and crosier, and recognized the freedom of elections; the new bishop, however, was to receive his temporalities by the scepter. In England Paschal II was engaged in a contest little less fierce than that with the emperor. Anselm, the primate, refused to do homage to Henry I, for his see. The king asserted an unqualified right of investiture, which the pope as unqualifiedly denied. After a protracted struggle the controversy ended in England, as it did afterwards in Germany, by compromise. Paschal offered to concede the objections against homage provided Henry would forego the ceremony of investiture. To this he agreed (1107).

Invoice (in'vois), an account in writing of the particulars of merchandise transmitted to a purchaser, giving price and quantity, note of charges, and any other needful details. By sending an invoice along with goods a merchant gives official advice to his correspondent of the understood terms of a contract. If the goods are received and the invoice retained this will be held valid evidence in law of the contract.

Involucre (in-vo-lū'kėr), in botany, a collection of bracts round a circle of flowers. In umbriferous plants it consists of separate narrow bracts placed in a single whorl; in many composite plants these organs are imbri-

Hemlock Plant.
a, Involucre. *bb*, Involucels.

cated in several rows. The same name is also given to the covering of the sori of ferns.

Involute (in'vu-lūt), in geometry, the curve traced by any point of a string when the latter is unwrapped, under tension, from a given curve.

Involution (in-vu-lū'shun), the calculation of any power of a quantity, that is, the multiplication of a quantity by itself any number of times. Thus $2 \times 2 \times 2 = 8$; here 8, the third power of 2, is found by involution. *Evolution* is the opposite process.

Io (ī'ō), in Greek mythology, the daughter of Inachus, beloved by Zeus, who, to protect her from the jealousy of Hera (Juno), changed her into a beautiful white heifer.

Iodine (ī'u-dīn; Gr. *ion*, a violet), a peculiar non-metallic elementary solid substance, symbol I; atomic weight 127. It exists in the water of the ocean and mineral springs, in marine molluscous animals, and in seaweeds, from the ashes of which it is chiefly procured (see *Kelp*). It exists also in certain land-plants and in cod-liver oil. It is found in certain minerals, the water of certain rivers, and the rain-water of several towns. At the ordinary temperature of the atmosphere it is a solid crystalline body. It unites readily with chlorine, potassium, etc., with the emission of light and great heat. It is a non-conductor of electricity, and, like oxygen and chlorine, is a negative electric. Like chlorine, it destroys vegetable colors, but with less energy. Its color is white, but as ordinarily seen is a bluish or grayish black and of a metallic luster. It is often in scales, resembling those of micaceous iron ore; sometimes in brilliant rhomboidal plates or in elongated octahedrons. The specific gravity of solid iodine is 4.947. At 225° it fuses, and enters into ebullition at 347°. Its vapor is of an exceedingly rich violet color, a character to which it owes its name. This vapor is remarkably dense, its specific gravity being 8.782. Iodine has a very acrid taste, and its odor resembles that of chlorine. It is an irritant poison; but in small doses has been of great service in certain forms of glandular disease. It is largely used in photography, in the preparation of aniline colors, and in other ways. It is very sparingly soluble in water, but dissolves copiously in alcohol and in ether, forming dark brown liquids. It possesses strong powers of combination, and forms, with the pure metals, and most of the simple non-metallic substances, compounds which are termed *iodides*. With hydrogen and oxygen it forms *iodic acid*; combined with hydrogen it forms *hydriodic acid*. This is a colorless gas, which strongly reddens litmus, and decomposes many chlorides. Starch is a characteristic test of iodine, forming with it a compound of a deep blue color. This test is so delicate that a solution of starch dropped into water containing less than a millionth part of

iodine is tinged blue by it. The great consumption of iodine is in medicine; it is employed in its pure state, but much more frequently in the form of iodide of potassium, which has been found of great benefit in goitre, scrofula, disease of the liver and spleen, in syphilitic affections, rheumatism, etc., as well as in lead-poisoning. Iodide of iron is another useful medicine, being employed in chlorosis, anæmia, and glandular affections.

Iodoform (ī-ō′du-form; CHI_3), a substance analogous to chloroform in composition, but in which iodine replaces chlorine. It is in the form of small, solid yellow crystals, and is prepared by the action of alcohol and other bodies on iodine and potash. It is nearly insoluble in water, but dissolves in ether oils and alcohol. It is used in medicine as an antiseptic, and acts slightly as an anodyne; it is successfully applied to ulcers and sores of various kinds, and is used as a snuff for cold in the head.

Iola (ī-ō′la), a city, capital of Allen County, Kansas, on the Neosho River, 8 miles N. of Humboldt. It is an agricultural center, and lies in the natural gas region of the state. It has large zinc smelters, large cement works, brick plants, and other industries. Pop. 9032.

Iolite (ī′u-līt). See *Dichroite.*

Ion (i′on), an ancient Greek tragic poet, a native of Chios, who flourished about 450 B.C. His tragedies were represented at Athens with great applause, and he is greatly commended by Aristophanes, Athenæus, etc.

Iona (ē-ō′na), an island of Scotland, one of the Inner Hebrides, belonging to the county of Argyle, separated from the southwest extremity of Mull by the Sound of Iona, 1¼ miles wide, and about 7¼ miles southwest of Staffa. The name is believed to be a misreading of *Iova, Ioua,* a name that occurs in old MSS., but the most common ancient name was I, Y, Hy (or similar forms). It was also commonly called I-colm-kil or I-columb-kill, that is, 'isle of Columba's cell' or 'isle of Columba of the cell (or church).' It is about 3 miles long by 1½ miles broad. It derives its interest from its history and old ruins, the remains of religious establishments of uncertain date, but popularly attributed to Columba, who took up his residence here in 563. They are all, however, of a much more recent date. The principal ruins are those of the cathedral church of St. Mary, of a nunnery, five chapels, and of a building called the Bishop's House. St. Oran's Chapel, as it is called, is supposed to be the most ancient; it is small, being only 60 feet by 20 feet. Attached to it is a burying-ground, in which various kings of Scotland, Ireland, and Norway are said to have found their last resting-place. The most extensive ruin is that of the church of St. Mary, which is cruciform, surmounted at the intersection of the nave and the transept by a square tower of about 70 feet in height. The length of the transept is 70 feet, and that of the body of the church, east to west, 160 feet. The island is now easily reached in summer by steamers daily from Oban. Pop. 243.

Ionia (ī-ō′ni-a), that part of the seaboard of Asia Minor which was inhabited by Ionian Greeks, a beautiful and fertile country opposite the islands of Samos and Chios, which also belonged to it. According to tradition the Greek colonists came over from Attica about the middle of the eleventh century B.C., and founded twelve towns, which, though mutually independent, formed a confederacy for common purposes. These included Phocæa, Ephesus, Miletus, etc., and latterly Smyrna. Commerce, navigation, and agriculture early rendered them wealthy and flourishing, but the country was made tributary by Crœsus, king of Lydia, and later by Cyrus, king of Persia (557 B.C.). With an interval of independence they remained under Persia until this empire was overthrown by Alexander the Great, 334-331 B.C., when they became a part of the Macedonian Empire. Ionia, at a later period, became part of the Roman province of Asia. It was later devastated by the Saracens. Few vestiges of its civilization remain.

Ionia, a city, capital of Ionia county, Michigan, on Grand River, 34 miles E. of Grand Rapids. It has various industries and a large trade in lumber, and is the seat of a State house of correction and an asylum for insane criminals. Pop. 5030.

Ionian Dialect. See *Greek Language,* under *Greece.*

Ionian Islands, a number of Greek islands in the Ionian Sea, extending along the western and southern shores of Greece, of which the largest are Corfu, Cephalonia, Zante, and Cerigo, others being Ithaca or Thiaki, Paxos and Santa Maura; area, 1097 square miles. All are extremely mountainous; and were it not for the vine, olive, and currant, especially the last, they could support but a small number of inhabitants. The climate is more uniformly temperate and humid than that of the mainland. The staple exports are oil, currants, valonia, wine, soap, and salt. The few manufactures are

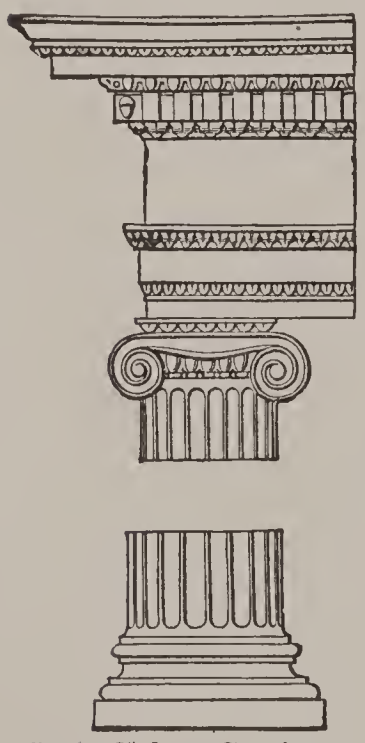
chiefly textile and ornamental. The religion is that of the Greek Church. The Ionian Islands often figure in the ancient history of Greece, but only singly. In 1386 Corfu voluntarily surrendered itself to Venice, and soon after the other islands placed themselves under its protection. In 1797 the French became masters. In 1809-10 they were occupied by British troops, and in 1815 the seven islands were formed into a republic, under the protectorate of Great Britain. They were transferred to Greece in 1864. Pop. about 250,000.

Ionian Mode, an old ecclesiastical mode or scale represented by the modern scale of C major.

Ionians. See *Greece* (*History*) and *Ionia.*

Ionian Sea, the ancient name of that part of the Mediterranean which lies between the south part of Italy and Greece.

Ionic Order, one of the orders of classic architecture, the distinguishing characteristic of which is the volutes of its capital. In the *Grecian Ionic* (1) the stylobate consists of three receding equal steps the combined height of which is from four-fifths to a whole diameter; (2) the column, which includes band, shaft, and capital, is rather more than nine diameters in height, the shaft being fluted with twenty-four flutes and alternating fillets; while (3) the entablature is rather more than two diameters in height. The volutes are connected on the flanks by a peculiar roll-molding, called the *baluster* or *bolster.* In the *Roman Ionic*, a modification of the later style, the stylobate is lofty and not graduated; the shaft diminishes one-tenth of a diameter and has twenty fillets and flutes; the capital, which is two-fifths of a diameter, has its volutes a little lower than the other, and a square abacus with molded edges covers the whole. The chief examples of the Grecian Ionic are those of the Athenian Acropolis; while those of the Roman Ionic are found in the temple of Fortuna Virilis and the Coliseum at Rome.



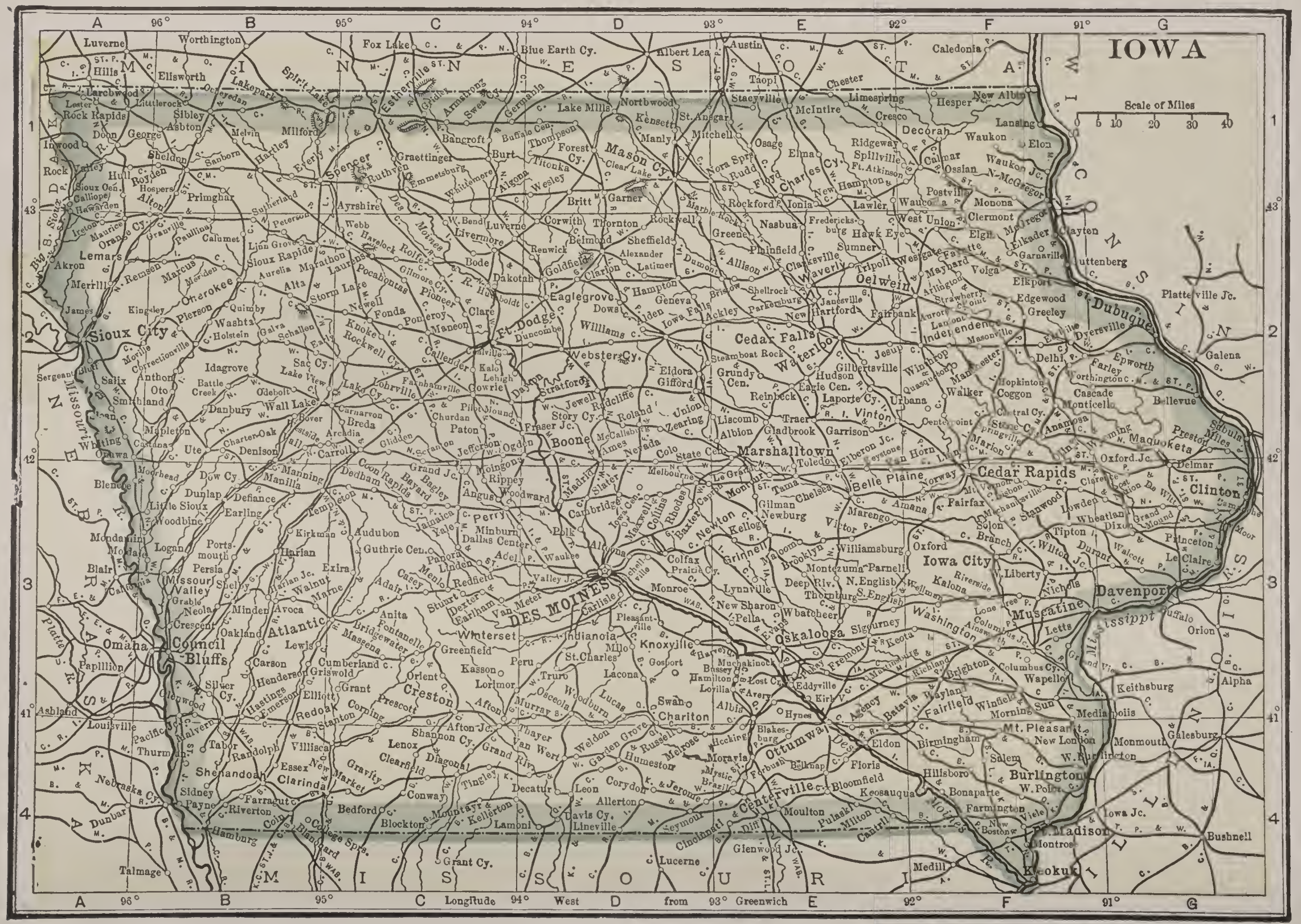
Ionic Order—Grecian.

Ionic School (ī-on′ik), the earliest school of Greek philosophy, a school which attempted to explain the phenomena of nature from the forces and attributes of matter itself. It taught the doctrine of the immediate unity of matter and life, according to which matter is by nature endowed with life, and life is inseparably connected with matter. The originator of this school, and indirectly of Greek philosophy in general, was Thales, who flourished about 600 B.C. The other chief philosophers of the school were Anaximander, Anaximenes, Heraclitus, and Anaxagoras. See the separate articles.

Iophon (ī′o-fon), a son of the great dramatist Sophocles, also a tragic poet. He is said to have gained the second prize in a contest with Euripides and Ion in 428 B.C. Of his plays, fifty in number, only a few lines are extant.

I. O. U., a written acknowledgment of debt, usually made in this form:—To Mr. A. B. I. O. U. Ten Dollars.—C. D. May 12th, 1889. An acknowledgment of debt made in this form requires no stamp. It is not negotiable. The letters I. O. U. are of course used instead of the words 'I owe you.'

Iowa (ī′ō-wȧ), one of the central United States, bounded on the north by Minnesota, east by Wisconsin and Illinois, south by Missouri, and west by Nebraska and South Dakota, from which it is separated by the Missouri River; area 56,147 square miles. It is well watered, its streams being all affluents of the large rivers which bound it on the west and east. To the Mississippi flow the Wapsipinicon, Iowa, Cedar, Skunk, and Des Moines, with a general S. E. course. To the Missouri flow the Big and Little Sioux and other streams. The surface is undulating, nearly four-fifths consisting of prairies covered with a rich coat of coarse grass, forming excellent pasturage. The climate is very healthy, and winter continues from December to March; the summer heat is tempered by frequent showers. The soil is in general very good, consisting of a deep black mould, intermingled in the prairies with sand, red clay, and gravel. The eastern portion is rich in minerals. Lead is wrought to a considerable extent, and zinc, iron, and coal are found. The coal-fields cover an area of 28,000 sq. miles, the lower coal-fields being the most important and covering an area of 6000 sq. miles. The output by the statement of 1909 was


IOWA
Scale of Miles
0 5 10 20 30 40
A 96° B 95° C 94° D 93° E 92° F 91° G
1
2
3
4
42°
41°
43°
Sioux City
Council Bluffs
Omaha
Atlantic
Creston
Shenandoah
Clarinda
Nebraska City
Louisville
Plattsmouth
Missouri Valley
Denison
Manning
Carroll
Harlan
Audubon
Guthrie Cen.
Adair
Anita
Casey
Menlo
Redfield
Dexter
Earlham
Van Meter
DES MOINES
Carlisle
Indianola
Winterset
Greenfield
Creston
Afton
Afton Jc.
Corning
Prescott
Redoak
Stanton
Villisca
Clarinda
Essex
Sidney
Farragut
Riverton
Hamburg
Talmage
Bedford
Clearfield
Lenox
Diagonal
Grand Riv.
Van Wert
Thayer
Osceola
Murray
Lorimor
Truro
Peru
Kasson
Orient
Cumberland
Griswold
Carson
Oakland
Minden
Avoca
Neola
Crescent
Missouri Valley
Logan
Portsmouth
Persia
Shelby
Walnut
Marne
Exira
Harlan Jc.
Atlantic
Lewis
Massena
Bridgewater
Fontanelle
Anita
Adair
Casey
Menlo
Redfield
Dexter
Earlham
Van Meter
Valley Jc.
Adel
Waukee
Altoona
Polk
Colfax
Prairie City
Monroe
Lynnville
Carlisle
Pleasantville
Indianola
Milo
Knoxville
Harvey
Gosport
Muchakinock
Bussey
Hamilton
Lovilia
Avery
Eddyville
Kirk
Lacona
St. Charles
Whitebreast
Osceola
Woodburn
Lucas
Swan
Chariton
Albia
Hynes
Blakesburg
Hocking
Russell
Melrose
Moravia
Humeston
Weldon
Garden Grove
Leon
Corydon
Jerome
Mystic
Brazil
Centerville
Bloomfield
Keosauqua
Allerton
Davis Cy.
Lineville
Decatur
Tingley
Mount Ayr
Kellerton
Lamoni
Grant Cy.
Lucerne
Glenwood Jc.
Medill
Kirkwood
Montrose
Keokuk
Bushnell
Moulton
Pulaski
Milton
Cantril
Farmington
New Boston
Viele
Bonaparte
Hillsboro
Salem
Floris
Belknap
Ottumwa
Blakesburg
Eldon
Birmingham
Fairfield
Batavia
Waylan
Agency
Libertyville
Morning Sun
Winfield
Mt. Pleasant
New London
W. Burlington
Burlington
Monmouth
Galesburg
Media
Keithsburg
Alpha
Wapello
Columbus Cy.
Columbus Jc.
Brighton
Richland
Washington
Oskaloosa
Sigourney
Keota
Fremont
Eddyville
Kirk
Avery
Lovilia
Hamilton
Bussey
Muchakinock
Harvey
Gosport
Knoxville
Milo
Indianola
Pleasantville
Carlisle
Van Meter
Earlham
Dexter
Stuart
Casey
Menlo
Redfield
Adair
Anita
Fontanelle
Bridgewater
Massena
Cumberland
Griswold
Carson
Oakland
Minden
Avoca
Neola
Crescent
Missouri Valley
Logan
Portsmouth
Persia
Shelby
Walnut
Marne
Exira
Harlan Jc.
Audubon
Guthrie Cen.

7,755,362 tons. Limestone, gypsum, and clay are abundant. The area occupied by forests and woodland is about 5,000,000 acres. Iowa is a great agricultural state, producing immense quantities of Indian corn, wheat, and oats, and also stands high in regard to dairy farming. Other industries include the manufacture of farm implements, flour-milling, pork-packing, machinery, smelting-works, etc. The length of railways open for traffic is about 10,000 miles. It possesses exceptional advantages for river trade, and the smaller streams supply abundant water-power. Education is well attended to. There is a State university (at Iowa City) and a flourishing State agricultural college. The settlement of Iowa began in 1833, when the first purchase of land from the Indians took place; its territorial government was instituted in 1838, and it was admitted into the Union in 1846. The capital is Des Moines; the principal towns being Dubuque, Davenport, Burlington, Council Bluffs, Sioux City, Cedar Rapids, and Keokuk. Pop. 2,224,771.

Iowa City, a city, capital of Johnson County, Iowa, on the Iowa River, at the head of the navigation. It contains the State university, and was once the State capital. It has important meat-packing and manufacturing industries, and a large shipping trade in grain, produce and stone. Pop. 10,091.

Ipecacuanha (i p - e-kak-ū-å′na), a substance used in medicine, of a nauseous odor and repulsive, bitterish taste, the dried root of several plants of the nat. order Rubiaceæ growing in South America. All the kinds have nearly the same ingredients, but differ in the amount of the active principle which they contain. The best is the annulated, yielded by the *Cephaëlis Ipecacuanha*, a small shrubby plant, a native of Brazil, Colombia, and other

Ipecacuanha Plant (*Cephaëlis Ipecacuanha*).

parts of South America. When given in very small doses ipecacuanha improves the appetite and digestive powers; in a somewhat larger dose it may be given to increase the secretion from the mucous membrane of the air-passages; and in a still larger, from 15 to 20 grains, it occasions vomiting. It is also capable, by being combined with other substances, of producing increased perspiration, as in the well-known Dover's powder. The name of *American ipecacuanha* is given to the *Euphorbia Ipecacuanha*, a plant which grows in sandy places in North America. It is emetic, purgative, and diaphoretic.

Iphigenia (if-i-je-nī′a), in Greek legend and poetry, daughter of Agamemnon and Clytemnestra. To avert the wrath of Artĕmis, whom Agamemnon had enraged by killing a consecrated hind, and who detained the Greek fleet at Aulis that had been prepared for the Trojan war, Iphigenia was to be sacrificed on the altar; but a hart was miraculously substituted for her, and she was conveyed in a cloud to Tauris. She became a priestess there to Artĕmis, and saved her brother Orestes when on the point of being sacrificed.

Ipomœa (ip-o-mē′a), a large genus of plants of the nat. order Convolvulaceæ, consisting mostly of twining prostrate herbs, widely distributed in warm regions. The species of most importance is *I. Purga*, which yields the jalap of commerce. See *Jalap*.

Ipsambul (ip-sam′bul), Abusam′bul, or Abusim′bel, a village of Nubia, on the left bank of the Nile; remarkable for containing two of the most perfect and magnificent specimens of Egyptian rock-cut temples existing. The façade of one of them is adorned with several stupendous colossal sitting statues of Rameses II (the Great), the largest pieces of Egyptian sculpture yet discovered.

Ipsara. See *Psara*.

Ipsica. See *Modica*.

Ipsus (ip′sis), a small town of Phrygia, Asia Minor, famous for a great battle fought B.C. 301. See *Antigonus*.

Ipswich (ip′sich), a river-port of England, capital of Suffolk, on the Orwell. It contains many interesting specimens of mediæval architecture. The public buildings include a fine town-hall, a new post-office, a custom-house, county courthouse, cavalry barracks, theater, etc. The industries embrace agricultural implements, machinery, artificial stone, artificial manure, silk, tanning, ropes, lime and cement, brewing, shipbuilding, etc. Ipswich is a town of great antiquity. It was originally called Gippeswich, from the neighboring river Gipping. King John gave it its first charter. Pop. (1911) 73,939.

Ipswich, a town in Essex County, Massachusetts, on the Ipswich River, three miles from the sea and 27 miles N. N. E. of Boston. Its industries include cotton and woolen hosiery, matches, isinglass, shoes, etc. Pop. 5777.

Iquique (i-kē′kā), a seaport of Chile, province of Tarapacá, recently a fishing village, but now a considerable town with an important trade, its rise being due to the extensive deposits of nitrate of soda and borax, and the silver mines, etc., in its neighborhood. It has suffered much from earthquakes, and in 1879 was blockaded, bombarded, and finally captured by Chile. Pop. 42,-440.

Irade (i-rä′de), a decree or command of the Sultan of Turkey directed to the grand vizier, whose duty it is to promulgate it to the public.

Irak Ajemi (ē-räk′ äj′e-mē), an interior province of Persia, separated from the Caspian Sea by Ghilan and Mazanderan; area, about 138,000 sq. miles, a large part of which in the east is occupied by salt deserts, the rest being largely mountainous, with some fine valleys and rich plains. The chief towns are the capital, Teheran, and Ispahan.

Irak Arabi (a-rä′bē), the district lying between the rivers Tigris and Euphrates, at the lower part of their course, corresponding nearly to the ancient Babylonia.

Iran (ē-rän′), or ERAN (Old Persian, *Aryana;* Zend, *Airyana*, that is, land of the Aryans), the name given by the ancient Persians to their native land, and still used by the modern Persians, though it is also employed in a wider sense to designate the whole of the country from the Indus to the Tigris, in contradistinction to Turan, the name often employed as synonymous, with Turkestan.

Iranian Languages (e-rän′i-an), a family of languages belonging to the Indo-European stock, closely allied to the Indian group, and called by some philologists Persian, from the best-known member of the family. The two oldest known Iranian languages are the Old Persian of the cuneiform inscriptions and the Old Bactrian or Zend, the latter the language in which the Zend-avesta or sacred writings of the Parsees is composed. The Middle Iranian languages are the Pehlevi, and still later the Parsee, which are preserved in the commentaries to the Zend-avesta. The latter approaches pretty closely to the modern Persian. The most important of the New Iranian languages is the modern Persian, in which has been produced a very rich and celebrated literature. The Afghan or Pushtu, and the dialects of the Kurds, form separate branches of the Iranian family.

Irawadi (ir-ä-wä′di). See *Irrawaddy.*

Irbit (ėr-bėt′), a town in Russia, in the government of Perm, on the frontiers of Siberia, at the confluence of the Irbit and the Niza. It is noted for a great annual fair, held in the month of February. Pop. 20,064.

Ireland (īr′land; in Irish, *Erin;* in Latin, *Hibernia*), the more western and smaller of the two principal islands of which the United Kingdom of Great Britain and Ireland is composed, is separated from Great Britain on the east by the Irish Sea, and surrounded on all other sides by the North Atlantic Ocean. Measured diagonally, the greatest length is 300 miles; and the greatest breadth is 212 miles; the central breadth, nearly between the bays of Dublin and Galway, is 110 miles. The area is 32,-531 square miles. Ireland is divided into four provinces of Leinster, Ulster, Munster, and Connaught, and into 32 counties.

The population in 1841 was 8,175,124; in 1851, 6,552,385, the decrease being partly owing to the famine resulting from the potato disease in 1846-47, and partly to emigration. Since 1851 over 4,000,000 emigrants have left the country. The returned population, at 1911 census, 4,-381,951. The capital is Dublin; the other chief towns are Belfast, Cork, Limerick, and Londonderry.

Surface.—The coast, forming a line of nearly 3000 miles, is, in general, bold and rugged, and is diversified by numerous indentations, some of which run far into the land and form excellent natural harbors. There are a considerable number of islands, chiefly on the west coast, the largest being Achill. The mountains, generally speaking, rise in isolated masses at a short distance from the coast, the interior having the form of a vast plain, in which are extensive tracts of bog. The Macgillicuddy's Reeks, in the southwest, are the highest, the culminating summit being Carrantual, 3414 feet. The mountains of Wicklow, in the southeast, reach the height of over 3000 feet (Lugnaquilla is 3039). Rivers are not only numerous but are very equally distributed over the surface. The Shannon, in the west, the largest river of Ireland if not of the United Kingdom, is navigable to its source in Lough Allen, forming a waterway of 240 miles. The other rivers of

most importance are the Bandon, Lee, Blackwater, Suir, and Barrow, which enter the sea on the south, the Liffey and the Boyne, entering the sea on the east, the former having the capital at its mouth, the latter being the largest river which discharges itself into the Irish Sea on the east coast; and the Bann and the Foyle, which have their mouths at no great distance from each other on the north coast. Ireland possesses a large number or lakes (or loughs). Lough Neagh, in the northeast, is a quadrangular expanse 17 miles long by 10 broad, and is the largest lake of the United Kingdom. Among the others the lakes of Killarney, in the southwest, are preeminent for beauty, and attract numerous visitors.

Geology and Minerals.—The mountains are formed of vast masses of primary and metamorphic rocks, while the secondary formations spread over the interior. Basaltic rocks are almost entirely confined to the northeast, where they often form colonnades, of which the Giant's Causeway is a celebrated specimen. Granite has its largest development in the southeast, where it forms the great mass of the mountains of Wicklow. It is more sparingly developed in the west and northwest (Donegal), as well as in the northeast. The lower rocks of the Silurian system form no inconsiderable portions of the whole island, covering large portions of the north-northeast and southwest as well as parts of the west. The Old Red Sandstone has its largest continuous development in the county of Cork, but rises to the surface at numerous isolated spots. The rocks next in the series belong to the Carboniferous system; at the bottom of which lies the Mountain Limestone, the most largely developed of all the rocks of Ireland, occupying almost the whole interior. In some cases, particularly in the southwest, the coal measures occupy considerable areas, but the quality of the coal is generally very inferior, and it is worked only to a very small extent, the yearly output being only about 100,000 tons. The strata higher in the geological series than the coal are very partially developed. Of other minerals than coal Ireland yields small quantities of iron ore, lead ore, slate, alum, salt, etc.

Climate.—The climate is on the whole moister, milder, and more equable than that of the greater part of Britain. It is highly favorable to vegetation, and allows plants to winter in the open air that can do so in very few places in Britain; some species of plants also being peculiar in Ireland alone of the British isles, as for instance the strawberry-tree or arbutus, found in the southwest.

Agriculture.—As regards agriculture, Ireland has great advantages, for though there is a great extent of moorland, there is also a very large area of arable surface, covered with a deep friable loam of remarkable richness. Notwithstanding, agriculture on the whole is in a backward state, a result largely due to the smallness of the holdings, and to the evils of overcropping. However, a steady diminution is now taking place in the number of very small holdings. The rearing of live stock and dairy-farming are largely carried on. By far the largest grain crop is oats; the chief green crop is potatoes, which cover an area about one and a half times as large as in Great Britain. Potatoes had become the main food of the people by the end of the seventeenth century, and a potato famine occurred as early as 1739. Another staple crop, especially in the north, is flax. Much benefit very gradually accrued to Irish agriculture from the operation of the Irish Land Act of 1881, the main provisions of which have been briefly summarized under the terms 'fair rent,' 'fixity of tenure,' and 'free sale.' By the first of these every tenant who objects to his rent or the rent the landlord wishes to exact, is entitled to have a 'fair rent' fixed for him by a court, this rent to remain unaltered for fifteen years. By 'fixity of tenure' the law recognizes that the tenant has a certain right in his holding in virtue of which he is not to be arbitrarily removed from it without compensation, and which enables him on leaving his farm to obtain the best price he can get for yielding up his possession. The 'free sale' of this right of tenancy is restricted only in so far as that it must be to one person only (except under agreement with the landlord), that the landlord may object on sufficient grounds to the person purchasing, and that he also has the right of preëmption. At the expiration of the fifteen years the landlord may resume possession of the holding on paying the tenant compensation for improvements effected by him, and also paying him the value of his tenant-right, both being determined by the court should the parties be unable to agree. This act, amended and extended in 1887, has been supplemented by the Land Purchase Act of 1903.

Industries and Trade.—Of industrial employments the linen manufacture is the chief and is in a very flourishing condition. It has increased in a remarkable manner within the last fifty or sixty years, and Belfast, its center, has now

become the first city of Ireland. The woolen manufacture at the outset outstripped that of linen; but it was hampered by unjust restrictions imposed by Parliament at the instance of the woolen manufacturers of England. The brewing of porter and distillation of whiskey form important industries. The fisheries employ a considerable number of persons, but far fewer than they should. The salmon fisheries are valuable and are increasing in value. The trade is only of a moderate bulk. The main articles of export consist of agricultural produce, the greater part of which finds its market in Great Britain. These articles include grain, live stock, salt and fresh meat, eggs, butter, etc. Of manufactured articles linen is the chief export; whiskey and porter are also exported. The trade with foreign countries is inconsiderable. The inland trade is much facilitated by the rivers and canals, on the improvement and construction of which respectively large sums have been spent.

Religion.—The prevailing religion is the Roman Catholic. The Reformation never made much progress, and though the Protestant Episcopal Church was established by law it was only the church of a small minority. In 1869 an act was passed for its disestablishment. Previously the clergy were supported by a tithe rent-charge, the proceeds of the church lands, etc., but by the new act, taking effect from January 1, 1871, the property and tithes formerly belonging to the church were vested in commissioners, who had charge of the winding up of the church's financial affairs, and their powers were in 1881 transferred to the Irish Land Commission, who are now engaged in completing the work. Part of the funds thus liberated has been expended on education and the relief of distress. At the head of the Roman Catholic Church are four archbishops, who take the title of Armagh, Dublin, Cashel, and Tuam, and twenty-four bishops. The whole of the Irish Roman Catholic clergy are supported solely by voluntary contributions. The number of priests is 3200, more than half being curates. There are numerous monasteries and convents. The Presbyterian Church is chiefly confined to Ulster, where it may be said, especially in the counties of Down and Antrim, to be the leading religious denomination. Its ministers are supported by voluntary contributions, seat-rents, and church funds. According to the census of 1901 there were in Ireland 3,308,661 Roman Catholics, 581,000 Episcopalians, 453,173 Presbyterians, 62,006 Methodists, and 28,000 members of other persuasions.

Education.—The principal educational institutions are Dublin University and the three Queen's Colleges of Belfast, Cork, and Galway. The Queen's Colleges were formerly connected with an examining and degree-conferring body (Queen's University); but for this a similar body, the Royal University of Ireland, was substituted in 1882, £20,000 being yearly granted from the surplus funds of the Irish Church. The Royal College of Science, established in 1867, supplies a complete course of instruction in science applicable to the industrial arts. The Catholic University of Ireland, established in 1854, consists of University College, Dublin, St. Patrick's College, Maynooth, and several other colleges. The seminaries for the education of the Catholic priesthood are numerous, the most prominent being the College of Maynooth, founded in 1795, and formerly receiving annually from government £26,360, for which, by the Irish Church Act of 1869, a sum of £372,331 was paid in compensation. The General Assembly's Theological College, Belfast, and the Magee College, Londonderry, are Presbyterian colleges. The chief elementary schools are those under the superintendence of the Commissioners of National Education. (See *Britain.*) In 1878 an act was passed setting apart £1,000,000 from the Irish Church surplus fund for the promotion of immediate secular education by means of special examinations, exhibitions, prizes, etc.

Government.—Ireland, by the Act of Union, became in 1801 an integral part of the United Kingdom, and shares in its legislation by means of twenty-eight representative peers in the House of Lords, and 103 representatives in the House of Commons. The representative peers are elected for life by the whole body of Irish peers. The lord-lieutenant, who represents the sovereign, is the head of the executive, and holds his court in Dublin Castle. He is assisted by a privy-council and a chief-secretary, who takes the most active part in the administration of affairs. As in England, the chief legal functionaries are a lord chancellor, a lord chief-justice, and a master of the rolls. The Irish police force is a semi-military body, paid out of the Consolidated Fund.

History.—The beginning of the history of Ireland is enveloped in fable. As in Western Europe generally, the earliest inhabitants are believed to have been of Iberian race, and, therefore, akin to the modern Basques. They were followed by the Celts, different tribes of whom probably arrived at different times, giving

rise to such names as Firbolgs, Milesians, etc. Among these the Scots were the latest, and latterly got the upper hand, so that their name became generally applied to all the inhabitants. There is no evidence that the Irish had the use of letters before the middle of the fifth century, when Christianity and Christian literature were introduced by St. Patrick. Subsequently Ireland became the seat of western learning, and its monasteries were the schools whence missionaries proceeded throughout continental Europe. Its internal condition, however, was far from satisfactory. Divided among a number of hostile kings or chiefs, it had been long torn by internal wars, and for nearly two centuries ravaged by the Danes, numbers of whom settled in the country, when, in the beginning of the eleventh century, Brian Boroimhé united the greater part of the island under his scepter, restored tranquillity and subdued the northern invaders.

After the death of Brian at the close of the battle of Clontarf, 1014, gained against the Danes and their Irish allies, the island relapsed into its former state of division and anarchy. In this state of matters Henry II of England obtained a papal bull giving him the right to subdue it, and the way was paved to this when Dermot, prince of Leinster, who had been driven from the country, was reinstated by the aid of Richard de Clare (Strongbow) and other Norman nobles. In 1172 Henry entered Ireland himself, and partly through the favor of the clergy and his affability, the great princes did homage to him and acknowledged his supremacy. Many Norman barons and their followers now settled in the country, but the English power was far from being established over it. For long only a part was recognized as English territory (generally known as 'the Pale'), and this was governed by various nobles, subject to a viceroy. The nobles quarreled among themselves, and were very often at open feud. In 1315 Edward Bruce, brother of the Scotch king, landed at the head of a large force, and was crowned king, but was defeated by the English in 1317 near Dundalk. The English power was greatly reduced by this expedition, however, and a number of the barons renounced their allegiance to England, and adopted the Irish language, laws, manners, and customs. This led to the passing of the Statute of Kilkenny (1367), forbidding, under severe penalties, intermarriages between English and Irish, the assumption of Irish names by persons of English blood, the use of the Irish language, the native (Brehon) law, etc. But the English rule became so weak that the viceroy found it necessary to protect the Pale by payments of money to the Irish chiefs, and this state of matters long continued. In the reign of Henry VII (1495) was passed Poyning's Act (so called from Sir Edward Poyning, lord-deputy of Ireland), which provided that all former laws passed in England should be in force in Ireland, and that no Irish Parliament, that is, the Parliament of the English settlers, should be held without previously stating the reasons why it was to be summoned, and the laws it was intended to enact. At the beginning of the sixteenth century the greater part of the island still remained unconquered by the English. The native Irish lived according to their old customs under their own chiefs, and in manners and mode of life were still totally uncivilized.

Henry VIII assumed (by act of the Irish Parliament) the title of King of Ireland, instead of *Lord*, which he had before borne as a vassal of the pope, and the Irish chiefs generally acknowledged his authority; but the change of religion was bitterly opposed, and Mary was easily able to undo all that had been done in this direction by her two predecessors. Elizabeth imposed a Protestant clergy upon the people, and her reign was marked by a series of risings, which terminated in the reduction of the whole island. Great stretches were taken from the Irish chiefs, and distributed among English noblemen and others, who were to settle their new estates with English farmers. Little was done in this way, however, compared with the great plantation of the North by James I, under whom 800,000 acres of land in Ulster were declared forfeited, a large part of this being entirely withdrawn from the Irish, and divided among Scotch or English settlers. In 1641 there began an attempt to shake off the English yoke, in which great atrocities were perpetrated on both sides. In 1649 Cromwell was appointed lieutenant, and energetically, but cruelly, reduced the whole country within nine months. The next struggle was that which followed the Revolution, when James II landed in 1689, and hoped to regain his crown by French and Irish aid. He failed to reduce Londonderry, which held out, enduring the extremity of famine, till it was relieved by some ships from England. In the following year (1690) William III arrived, and on the 1st of July gained a decisive victory over the forces of James on the Boyne, near Drogheda. In 1691 another victory was gained over the Irish at Aughrim in Galway, and in October

Limerick, the last place that held out for James, capitulated, a treaty being concluded at the same time, by which the Catholic Irish were to be allowed the free exercise of their religion. The Treaty of Limerick was ill kept by the English. By a decree of Parliament upwards of 1,000,000 acres were confiscated and divided among Protestants. Cruel penal laws were passed against those who adhered to the Catholic religion. The Catholic ecclesiastical dignitaries were banished; the subordinate priests were not allowed to leave their counties; no Catholic could hold a public office, acquire landed property, enter into a marriage with a Protestant, etc.

Although these laws were not always rigorously carried out, yet they excited great bitterness of feeling, and produced frequent revolutionary associations (*Whiteboys* and others), which mark the history of Ireland. In 1778 the penal laws against the Catholics, though not repealed, were made much more lenient. Catholics were henceforth permitted to acquire landed property, to erect schools, and to observe their own religion under fewer restrictions. In 1782 Poyning's Act was repealed, and freedom of legislation allowed to the Irish, though Catholics were still excluded from Parliament, and did not even have the franchise till 1793. The French revolution had a great effect on the minds of the Irish people, and it was partly through this influence that the Society of United Irishmen was formed, and that rebellion broke out in 1798. Great atrocities were perpetrated, but the rising was speedily crushed. A body of French soldiers, 1500 strong, landed in Killala Bay, but were compelled to surrender.

The British government now resolved to unite the Irish and English Parliaments, and an act providing for the legislative union of the two countries passed the Irish Parliament in May, 1800, and the British Parliament in July of the same year, in virtue of which the union was effected on the 1st of January, 1801. But although this measure bound the destinies of the two countries still more closely, yet it was far from putting an end to the troubles which had so long divided them. In 1829, mainly through the efforts of O'Connell, the Catholic Emancipation act was passed, under which Catholics could take a seat in Parliament and were admitted to most public offices. (See *Catholic Emancipation.*) The Irish national party now tried to repeal the Union, for which purpose O'Connell founded the Repeal Association. This movement collapsed in 1843, and afterwards the potato famine in 1845, and again in 1846, cast all other interests into the background. To mitigate this calamity Parliament granted enormous sums of money; yet thousands died from starvation, and hundreds of thousands emigrated to America. Anarchical outbursts, agrarian murders, and other acts of violence distracted the land. Meanwhile O'Connell died, and his party was replaced by one still more advanced, called the Young Ireland party. In these circumstances the French revolution in 1848 had a great effect upon Ireland. The leaders of the Young Ireland party, Smith O'Brien, Mitchel, Duffy, Meagher, and others, entered into relations with the provisional government at Paris, and the people began openly to exercise themselves in the use of arms. But the rebellion turned out a mere fiasco. After the famine and great emigration a general improvement became visible among the inhabitants. Agriculture revived, and the manufacturing industries began to compete with those of England.

The year 1865 witnessed a new conspiracy designed to separate England and Ireland. This originated in the United States, when the numerous Irish during the civil war in that country hoped for a rupture between it and England, of which they might take advantage. This conspiracy, the members of which called themselves *Fenians* (see *Fenians*), soon spread to Ireland; but before they could take any overt action in that island their design was stifled by the British government (1865-66). The ministry now resolved to do all in their power to render the Irish people loyal and contented; and accordingly the Irish Episcopal Church was disestablished in 1869, and another act was passed to improve the tenure of land, in 1870.

Since 1871 an agitation for what is called Home Rule has made itself prominent. Its chief supporters, designated 'Nationalists,' profess not to desire the severance of Ireland from Britain; what they mainly want, is to have an Irish Parliament for matters exclusively Irish. In 1880 Ireland became the scene of an agitation carried on mainly by a body known as the Land League. The movement was so lawless that two special acts, a 'coercion' act and a peace preservation act, were passed. Still further to redress Irish grievances a land act was also passed in 1881, the chief provisions of which have already been mentioned. The Land League was suppressed, but a body called the National League was soon organized in its place. In 1885, 86 Nationalist members (under the lead-

ership of Mr. Parnell) were returned to Parliament, and their pressure on the government led to Mr. Gladstone's scheme in 1886 by which Ireland was to receive a Parliament of her own and the Irish members to be withdrawn from the Imperial Parliament. This and the accompanying scheme for the buying out of Irish landlords were rejected by Parliament and the majority of the constituencies, thus bringing a Conservative government under Lord Salisbury into power. (See *Britain.*) A permanent act for the repression of crime in Ireland was passed in 1887, and an act (Lord Ashbourne's) for the benefit of Irish tenants, under which money is advanced to them to aid them in buying their farms. The agitation by the Home Rule party has continued to the present time and is looked upon as very hopeful of success, the Irish membership having now unusual power in Parliament as an intermedium between the contending factions. What is desired is power of home legislation for internal affairs, such as is enjoyed in Canada and Australia. In August, 1898, an Irish Local Government Bill was passed, and in 1903 a Land Purchase Bill was enacted, which promised to go far in relieving the distress of the agricultural population. In this the government set aside the sum of £100,000,000 for the purpose of buying the farming areas from landlord holders and giving to tenants, subtenants, or the people at large the privilege of purchasing and holding farms as their own, easy terms of payment, extending over many years, being provided. This provision for purchase has proved inadequate, and it is estimated that not less than £183,000,000 will be needed for the purpose. This will be held as a lien against the land and will eventually be repaid by the farmers. the result being that the Irish people will replace absentee landlords as the owners of their arable land.

Language and Literature.—The Irish language belongs to the Gaelic or Gaedhelic branch of the Celtic stem of languages, being closely akin to the Gaelic of Scotland and the Manx, and more remotely allied to the British dialects (Welsh, Cornish, and Armoric). The modern dialects or varieties of Irish, which differ very much from the ancient, are spoken by the rural classes in Connaught and Munster, and the more remote parts of Ulster. In 1901 there were 64,000 people in Ireland who spoke Irish only, and over 885,000 who could speak it along with English. Gaelic may be considered a comparatively modern form of ancient Irish.

Irish literature is rather varied and extensive, including history, legendary and actual, in prose and verse, annals, genealogies and pedigrees, mythological and imaginative tales, lyric poetry, satire, lives of saints, treatises on law, science, grammar, etc. Some of these may be as old as the fifth century of our era. One of the earliest historic pieces is a metrical life of St. Patrick. Among the most important of the heroic tales is the *Táin Bo' Cuailnge* or *Cattle Spoil of Cualnge*, the center of a series of epic tales. A certain number of poems and tales, forming a cycle of their own, may be called Ossianic; most of them are comparatively modern. The glosses written to Latin works by Irish ecclesiastics, in the monasteries on the Continent founded during the seventh and eighth centuries, are among the oldest specimens of the language. Many bardic remains belong to the period of the English conquest, but after that date Irish poetry appears to have sunk. Many bards, however, who were still maintained by the native chiefs, helped by their songs to keep up a national feeling hostile to the English domination. The native authorities for Irish history may go back to St. Patrick at the very earliest. The oldest of kings dates from the middle of the eleventh century. The oldest and by far the ablest annalist, whose works have been at least partially preserved, is Tighernach O'Brian, who belonged to the royal family of the O'Connors of Connaught. He died in 1808. The other chief annals are the *Ulster Annals*, the *Annals of Innisfail*, and the *Annals of the Four Masters* (from its four conjoint compilers). The most important Irish manuscripts are contained in the library of Trinity College, and the Royal Irish Academy, Dublin, in the Bodleian Library, and the British Museum.

Ireland, John, Archbishop, was born in County Kilkenny, Ireland, in 1808. The most important Irish manuscripts are contained in the library of Trinity College, the Royal Irish Academy, Dublin, and the British Museum. Of modern Irish writers, the best known are those connected with the Irish National Theater—the poet, W. B. Yeats; Lady Gregory, J. M. Synge and others.

Ireland, William Henry, born in London in 1777; died in 1835. He imposed spurious Shakesperean MSS. upon his father, and also upon other men of letters, and subsequently produced two pretended 'Shakesperean' plays, called *Vortigern* and *Henry II.* The criticisms of Malone led to the exposure of the fraud.

Irenæus (ir-e-nē′us), SAINT, Bishop of Lyons, a pupil of Polycarp, was probably a native of Smyrna, and born between 120 and 140 A.D. He is generally supposed to have suffered martyrdom at Lyons, in the persecution under Septimius Severus in 202. He actively opposed the Gnostics. Only some fragments remain of his *Libri V adversus Haereses*, written in Greek. There is, however, a very ancient Latin version.

Irene (ī-rē′nē), Empress of Constantinople, was born at Athens about 752 A.D., and in 769 married Leo IV, after whose death she (780) became regent during the minority of her son, Constantine VI. She had during the life of her husband been banished from the imperial palace for her devotion to the worship of images; but in 788 A.D. a council of bishops held at Nice under her auspices restored image worship in the Eastern Church. When Constantine had grown up he took the reins of government himself, and reigned alone seven years, when his mother had him arrested and his eyes put out, and he was at last murdered. Irene was the first woman who reigned over the Eastern Empire. She had ordered many nobles into banishment to secure more firmly her power, but Nicephorus, her treasurer, through their influence gained the imperial throne, and exiled her in 802 to the isle of Lesbos, where she died of grief in 803.

Ireton (īr′ton), HENRY, a Parliamentary general in the English revolution, was born in Nottinghamshire in 1610. Descended from a good family, he was brought up to the law; but when the civil contests commenced he joined the Parliamentary army, and by the interest of Cromwell, whose daughter Bridget, he married in 1646, he became commissary-general. He commanded the left wing at Naseby, which was defeated by the furious onset of Rupert, and himself made prisoner, but some hours after he recovered his liberty. He was an implacable enemy of the king, had a principal hand in framing the ordinance for his trial, and sat himself as one of the judges. Ireton accompanied Cromwell to Ireland in 1649, and was left by him as lord-deputy. He reduced the natives to obedience with great rigor, but cruelly. He died of the plague before the walls of Limerick, 1651, and was buried in Westminster Abbey 1652.

Iriartea (ir-i-ar-tē′a), a genus of South American palms, tall-growing trees, of which one species, *I. exorrhiza*, the pashuiba or paxuiba palm, yields a hard kind of wood used for building, and exported for umbrella handles, etc.

Iridaceæ (ir-i-dā′se-ē), a natural order of endogenous plants, mostly herbaceous, and with equitant leaves (that is, leaves overlapping entirely in a parallel manner), three stamens with extrorse anthers, and an inferior ovary; natives chiefly of the middle parts of Europe and North America and the Cape Colony. They have beautiful flowers, and include the iris, gladiolus, crocus, ixia, etc.

Iridescence (ir-i-des′ens), the sheen of mother-of-pearl and other objects which have a finely-grooved surface. It is due to the interference between the waves of white light reflected from different levels in the grooving, the reflected light presenting colors which vary according to the angle of reflection.

Iridium (ī-rid′i-um), a metal of a whitish color, not malleable, discovered in the black scales which remain when native platinum is dissolved in aqua regia; specific gravity about 22.4; symbol Ir. It takes its name from the variety of colors it exhibits while dissolving in hydrochloric acid. It is the most infusible of metals. It forms a number of alloys, one of which, iridosmine, occurs native. The alloy with gold is malleable and much resembles gold in appearance, while that with copper is very hard, pale red in color, and ductile.

Iridosmine (ī-ri-dos′min), IRIDOSMIUM, a native compound of iridium and osmium, forming an osmide of iridium, in which the iridium is partly replaced by platinum, rhodium and ruthenium. It is used for pointing gold pens, and iridium is obtained from it.

Iris (ī′ris), in Greek mythology, the fleet golden-winged messenger of the Olympian gods. Iris was originally the personification of the rainbow, though she does not appear as such in the Homeric poems. She is represented with wings attached to her shoulders and a herald's staff in her left hand, representative of her office of messenger.

Iris, the muscular curtain stretched vertically in the anterior part of the eye, perforated by, containing, and forming the colored circle around the pupil. See *Eye*.

Iris, a plant that gives name to the natural order Iridaceæ, and is also called flag and flower-de-lis. The plants of the genus *Iris*, some of which are medicinal and others merely ornamental, are found in many localities over Europe,

Asia, and America. They usually grow in wet places, bearing flowers of various colors, but the prevailing tint is blue. The stinking iris (*I. fœtidissima*) of southern England has purple flowers and ill-smelling leaves. Orris-root consists of the root-stock of some species, as *I. florentina;* and the root-stock of this and other species are cathartic or emetic. Many beautiful species are grown in gardens. The most admired species are the Persian (*I. persiea*), the snake's head (*I. tuberōsa*), the Chalcedonian, the Spanish, and the English.

Iris, one of the asteroids or planetoids.

Irish Car. See *Jaunting Car.*

Irish Church, Language and Literature, See *Ireland.*

Irish Moss. See *Carrageen.*

Irish Sea, the sea between Great Britain and Ireland, north of St. George's Channel and south of the North Channel, 130 miles long and about 60 miles wide. It contains the islands of Anglesey and Man.

Irish Society, a society formed under James I, by twelve London companies, to colonize the confiscated lands in the north of Ireland, which, when they were thus settled, were named the Ulster plantations. These companies still own much land in Ulster.

Iritis (ir-ī′tis), inflammation of the iris of the eye. The symptoms of iritis are a zone of a pale pink color round the cornea, formed by vessels traversing the sclerotic; and the iris itself undergoes a remarkable change of color. The patient experiences pain in the orbit of the eye, in the forehead, and side of the head, which frequently grows more intense at night. Iritis may arise from wounds in the iris, from too prolonged continuous use of the eye, or from constitutional predisposition induced by syphilis, scrofula, etc. It may be treated according to circumstances by bloodletting, belladonna, and mercury.

Irkutsk (ir-kötsk), a town in Southern Siberia, capital of government of same name, at the junction of the Irkut with the Angara, about 40 miles from Lake Baikal. It is the residence of the governor-general of Eastern Siberia, has a cathedral and a number of public buildings. Manufactures woolens, linens, leather, etc., and carries on a good trade in tea and other articles imported from China, furs, etc. Pop. 51,434.—The government, which is bounded by Yeniseisk, Yakutsk, Trans-Baikalia, Lake Baikal, and Chinese Turkestan, has an area of about 287,000 sq, miles, and a population of about 500,000, a number of whom are persons banished from Russia.

Iron (ī′ėrn), the most universally distributed and the most generally applied of all the metals (Lat. *ferrum;* symbol Fe). It is the most tenacious of the metals, having a breaking strain of 106,000 lbs. per sq. inch of section; and two pieces can be perfectly welded together when raised to a white heat. It is so ductile that it can be drawn into wire as fine as the human hair. It occurs chiefly in the earth's crust in combination with oxygen, but it is also found in combination with several other elements, and sometimes, although rarely, *native* or in the metallic state. There are two varieties of native iron, the *telluric* and the *meteoric.* The former occurs in small quantities only, in grains and thin plates, associated with other metals, principally lead and copper. It is of a white color, as can be seen on a freshly fractured surface, but in contact with air is of a steel-gray color. Meteoric iron is a pale steel-gray, very malleable and tough, flexible but not elastic. It has been found in masses in various parts of Europe, Africa, and America, and derives its name from having traveled through the air in the form of meteors, and having been brought to the earth from outside space by the attraction of gravity. All the specimens of meteoric iron analyzed contained nickel, most of them also cobalt, besides copper, manganese, and other minerals.

It is from one or the other of its *ores* that the iron of commerce is obtained. The ores of iron are very numerous, but the oxides, carbonates, and sulphides are the most important, and, from the manufacturing point of view, the following are the most valuable:—1. *Magnetic Iron Ore.* This, the richest of all the ores of iron, contains, when perfectly pure, 72.41 per cent. of metallic iron. It is iron-black in color, with a metallic lustre, highly magnetic (especially the specimens of it that are called *native lodestone*), and extremely infusible. It is most commonly found in palæozoic rocks, generally in beds and large masses. Some mountains in Lapland and Chile consist almost entirely of this variety of ironstone. In Sweden it exists in great abundance and purity, and good bar-iron is produced from it. It is plentiful also in Norway and Russia, the East Indies and China, and in North America occurs in beds in granitic mountains in the northeast part of the United States, and in many other

tracts. Various parts of Great Britain also possess deposits of magnetic ore. Its specific gravity varies from 4.24 to 5.4. 2. *Hæmatite* or *Specular Iron Ore, Red Hæmatite.* This mineral in its purest state contains about 70 per cent. of iron. Specular ore is a deep steel-gray in color, with a brilliant, and often iridescent tarnish externally; its fracture exhibits a brilliant luster. It is opaque in large fragments, but the edges of small thin scales are of a blood-red color by transmitted light. It occurs crystalline and lamellar, hard and massive, earthy and friable. This ore is found in the older rocks, especially gneiss and granite, both in beds and veins. Great Britain has vast deposits of hæmatite in Cumberland, Lancashire, Devonshire, and Cornwall, the red ores being chiefly utilized by British smelters. France, Germany, Russia, and North and South America, have large deposits of the crystalline variety. 3. *Brown Iron Ore, Brown Hæmatite.* This variety consists essentially of hydrated ferric oxide, and contains when pure about 60 per cent. of iron along with about 16 per cent. of combined water. Brown iron ore occurs plentifully in France, Germany, Belgium, and in England, chiefly in the Forest of Dean, in Devonshire, Lincolnshire, and near Durham. Brown hæmatite is generally a yellow powder, sometimes passing into a brown or velvet black. It affords a very malleable and much harder iron than the red ore, and very good steel. Before the blowpipe it blackens and magnetizes but after calcination and cooling the powder becomes red, and in this state is much used for polishing metals. There are also many varieties of brown hæmatite, to which distinctive names are applied. *Bog iron ore* is a variety of brown hæmatite which occurs in most European and many American countries, and is so named from its being chiefly found in marshy places. It is considered to be of recent formation, and the iron obtained from it can but rarely be used for sheet-iron, and never for wire. 4. *Spathic Iron Ore.* This mineral, as the name implies, resembles rather an earthy than a metallic substance, and consists essentially of ferrous carbonate. In its purest state it contains 48.27 per cent. of iron, and occurs in the older rocks and in limestone strata in veins and beds. The chief deposits of this mineral are in Styria and Westphalia, and large deposits exist also in the Pyrenees, in New Grenada, and in Great Britain. This ore is very valuable for making steel, being free from those substances which act injuriously in its manufacture. Spathic ironstone is often associated with considerable quantities of clayey and coaly matter; when the former substance predominates the ore is known as *argillaceous* or *clay-band ironstone;* when the coaly matter is in excess the ore is called *carbonaceous* or *black-band ironstone.* These varieties occur in most of the coal-fields of Great Britain, and supply the greater part of the iron produced there. It is also worked in France at the coal-fields of the Gard, of the Aveyron, and near St. Etienne. In America this ore also occurs, widely distributed. The color of the clayey carbonates of iron varies from reddish-brown through yellow-brown to dark brownish-black. 5. *Iron Pyrites.* This mineral, when pure, consists of 53.33 per cent. of iron combined with 46.67 per cent. of sulphur, and is the most widely distributed of all the ores of iron. It occurs in many forms disseminated in rocks, veins, and beds, investing other minerals, sometimes inclosed in them. The ordinary color is brass-yellow, but owing to decomposition often assumes grayish and brownish tints. Before the blowpipe it melts, giving out a sulphurous odor, and leaving a blackish slag, which is magnetic. This ironstone is chiefly used as a source of sulphur, but in Siberia it is worked for the small percentage of gold it contains.

Before the ores pass into the smelter's hands they are subjected to the preliminary process of *calcination* or *roasting.* The object of this operation is to separate water, carbonic acid, sulphur, and other volatilizable substances from the ore, and at the same time to render the ore more porous. This is now generally effected by placing the ironstone over a coal-fire at the bottom of a kiln; when the ore is red-hot a fresh layer, 8 or 9 inches in depth and mixed with coal, is added, and so on until the kiln is filled. When the bottom layer is cold it can be withdrawn, and the process thus becomes continuous. Formerly ores were roasted in piles in the open air, but this wasteful and irregular method is now only resorted to in localities where time and fuel are of little consideration. Ironstone loses from 25 to 30 per cent. of its weight by calcination; the black-band variety, which almost supplies its own fuel, from 40 to 50 per cent.

The *smelting* of the iron is the next process, that is, the production of the metallic iron from the ore. The iron-smelter must carefully consider the nature of the ores to be treated, and the due admixture of different varieties; the most suitable fuel; the production and maintenance of a high and even temperature; and he must also select such materials

to mix with the ores as shall form with the non-essential constituents of the iron-stone a slag which shall remove all hurtful ingredients, being so liquid as to float on the surface of the molten iron and flow easily from it. The most advantageous combination of ores can only be determined by experience, but as regards fuel there is generally no choice. Until the beginning of the seventeenth century charcoal was exclusively used for iron-smelting, but coal and coke have now taken its place, except in those countries where forests still abound and charcoal can be procured readily and cheaply. Chief among iron-smelting appliances is the blast-furnace, and the great progress made in the production of pig-iron during the past 30 years is largely due to better constructed furnaces. In those of the most recent type the waste gases of the furnace are utilized for raising heat and steam, with a consequent large saving in fuel, and the residual or by-products which were formerly lost are also collected, all tending to reduce cost of manufacture. (See *Blast-furnace.*) The molten iron, as it runs from the furnace, is conducted along channels excavated in strong binding sand into molds of the same material, in which it solidifies, forming what is known as *pigs*. For casting purposes the pig-iron is generally melted in a special furnace, called a cupola furnace. This apparatus consists of a cylindrically-shaped furnace, varying from 7 to 10 feet high, and having an internal diameter of about 3½ feet; it is composed of thick iron plates strongly riveted together, protected inwardly by a layer of binding sand about 9 inches thick, the whole being lined with fire-clay bricks. See *Casting.*

To obtain *malleable* or *wrought iron*, it is necessary to free the pig-iron from the sulphur, phosphorus, silicon, and excess of carbon it contains, as these substances lessen the tenacity of the iron, and render it unfit for rolling into bars or plates. But a small quantity of carbon (under 1 per cent.) is essential to the formation of good malleable iron; perfectly pure iron would be too soft. The means by which the elimination of foreign materials from, but retention of a small amount of carbon in, the iron are accomplished are partial oxidation of the iron, succeeded by the removal of the foreign substances in the form of oxides, partly by volatilization and partly by combination with the already oxidized iron in the form of slag. This is done by the process of *puddling*. Formerly the iron-puddler submitted the pig-iron to a refining process previous to passing it into the puddling-furnace, but since the introduction of Danks' and other furnaces, and the substitution of machine for hand-labor, this preliminary process has been generally abandoned. In the ordinary puddling-furnace there is a hearth, on which the pig-iron is placed, and a grate separated from it, in which the fuel is placed. In this furnace the iron is subjected to a great heat, but it is only the heated gases that are allowed to play upon the metal, the shape of the furnace being designed to throw the heated gases down on to the surface of the molten mass on the hearth. In the furnace there is a suitable aperture through which the puddler thrusts his rake or *rabble*, and so stirs up the metal, thus assisting in the process of oxidation. When the iron is sufficiently purified the puddler works it together into balls or *blooms* weighing each about 60 lbs. When the whole of the metal has been collected into blooms the door of the furnace is closed, and the temperature is raised to a full welding heat. The blooms are then carried to a powerful squeezer or to a steam-hammer. The melted slag is thus forced out of the ball, which is at the same time welded into a compact mass of metal, ready to go through the *puddling rolls*, which consist of grooved iron cylinders. These cylinders revolve in opposite directions, so that the metal in passing through them is powerfully compressed, whereby any slag remaining in it is squeezed out. The iron while still hot is cut into pieces by a pair of shears, which pieces are bound together by wire, and subjected to the operation of *re-heating* or passing through the *mill-furnace*. The bars are heated to a welding temperature, then again passed through the rolling-mill, whereby they are converted into a single bar. This bar may be again bent upon itself and again rolled, thereby producing what is known as *best bar* or *wire iron*. This iron is very tough and tenacious; it may be bent or even tied in a knot when cold without exhibiting the least sign of fracture. If iron breaks off when bent in a cold state it is said to be *cold-short*; while if it stands this treatment, but becomes brittle at a high temperature so as to be unfitted for welding, it is called *red-* or *hot-short*. The presence of foreign elements influences these two properties of iron in a marked degree; thus a very small amount of sulphur, even such a quantity as .05 per cent., causes bar-iron to become red-short. Bar-iron possesses a specific gravity varying from 7.3 to 7.9. The melting point is estimated at being about 2900° Fahr., and of cast-iron 1920° Fahr.

By the Siemens regenerative and other similarly constructed furnaces, malleable iron and steel are now prepared directly from the ore. In recent years 'malleable castings' have been introduced. The castings are made of ordinary cast-iron, and rendered malleable by the removal of the carbon. In large cast-iron pots the castings are laid with alternating layers of powdered red hæmatite, and the whole is kept at a temperature of about 1650° Fahr., or cherry-red heat, for 72 hours. On cooling, the castings are found to consist of nearly pure iron, and to be perfectly malleable, and, therefore, workable.

If iron is heated frequently or carelessly it ceases to be fibrous and loses its tenacity; it is then said to be *burnt*. To restore it to its original condition, a fresh and very careful forging is generally needed. This may also be done by heating the piece of iron to bright redness, and plunging it into a boiling saturated solution of sea-salt until it is of the same temperature, about 230° Fahr. After this operation the metal can be easily doubled in the cold.

It is not always easy to draw the line between iron and steel, and many varieties of metal come into the market under the name of steel which in reality are alloys of iron with other metals, such as wolfram, manganese, chrome, etc. It is admitted by all metallurgists that one of the characteristics of true steel is that it hardens when heated and then suddenly cooled in water; but wolfram steel, for instance, exhibits the very opposite property. Experienced workmen can distinguish iron from steel by the musical note emitted on striking. A more certain method consists in treating the metal with diluted nitric or sulphuric acid. If the surface remains unaltered, or nearly so, when touched with a drop of either acid, the metal is iron; in the case of steel a black mark will be left, owing to the liberation of carbon.

Pure iron is a silver white metal, with a strong lustre, very tenacious, capable of receiving a high polish, and so soft as to be easily cut with a knife. It may be obtained by heating nitride of iron in a stream of hydrogen, or by electrolytic precipitation but, according to Matthiessen, however metallic iron is obtained it always contains a trace of sulphur. In its chemical analogies iron is closely related to the metals cobalt, nickel, and chromium; it belongs to the hexad group of metals, and forms a large series of salts. The atomic weight of iron is 55.9 or 56. Iron dissolves slowly in dilute nitric acid; if not diluted, this acid rapidly oxidizes it. Dilute sulphuric acid dissolves this metal easily, but if concentrated, it has no action in the cold, whereas, on heating to ebullition, the iron is dissolved with evolution of sulphurous acid gas. Iron is also dissolved in hydrochloric acid and in aqua regia.

The principle iron manufacturing countries are the United States, Great Britain, Germany, France and Belgium. The production of iron and steel has made rapid strides in the United States. This country has now a much larger output than any other, and from being an importer has become a great exporter. Great beds of iron ore occur in Pennsylvania, West Virginia, Tennessee, Alabama, in Michigan and other States bordering Lake Superior, in Missouri, Arkansas, Wyoming and some other States. There are immense beds of bog-iron in Washington. Pennsylvania is the greatest iron-producing State. For the manner in which iron is converted into steel, see *Steel*.

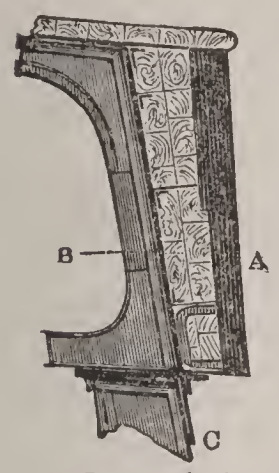
Besides its numerous other uses, iron is of great value medicinally, especially as a tonic and restorative of the blood. Hence it is very efficacious in anæmia and chlorosis, in rickets and scrofula, and in convalescence from various illnesses. In neuralgia it is often beneficial, and especially when given along with quinine. Some of its preparations have a styptic or astringent effect. It is given in many forms, as the carbonate, citrate, sulphate, perchloride, etc. Mineral waters often owe their useful properties to iron, being then known as chalybeate springs.

Iron-bark (*Eucalyptus resinifĕra*, one of the 'gum-trees'), an Australian tree growing to the height of 100-150 feet, with heavy, strong, and durable timber. It is, however, difficult to work and apt to be 'shaky.'

Iron and Steel-clad Vessels, a term now applied to all vessels protected from the fire of heavy guns by thick plates of iron or steel, usually backed by wood. The iron-clad is comparatively a modern invention, and it was not until 1859 that Britain began to introduce such vessels into her navy; but since that time greater changes have taken place in the construction of warships than in all previous ages. The idea of protecting vessels by iron was first practically applied to some floating batteries by the French in the Crimean war. The shells thrown by the cannon then in use were calculated to make terrible havoc among the crowded crews of the wooden battleships of that period and some extra protection became necessary. The first iron-clad, *La Gloire*, was constructed by the French in 1858, a wooden ship

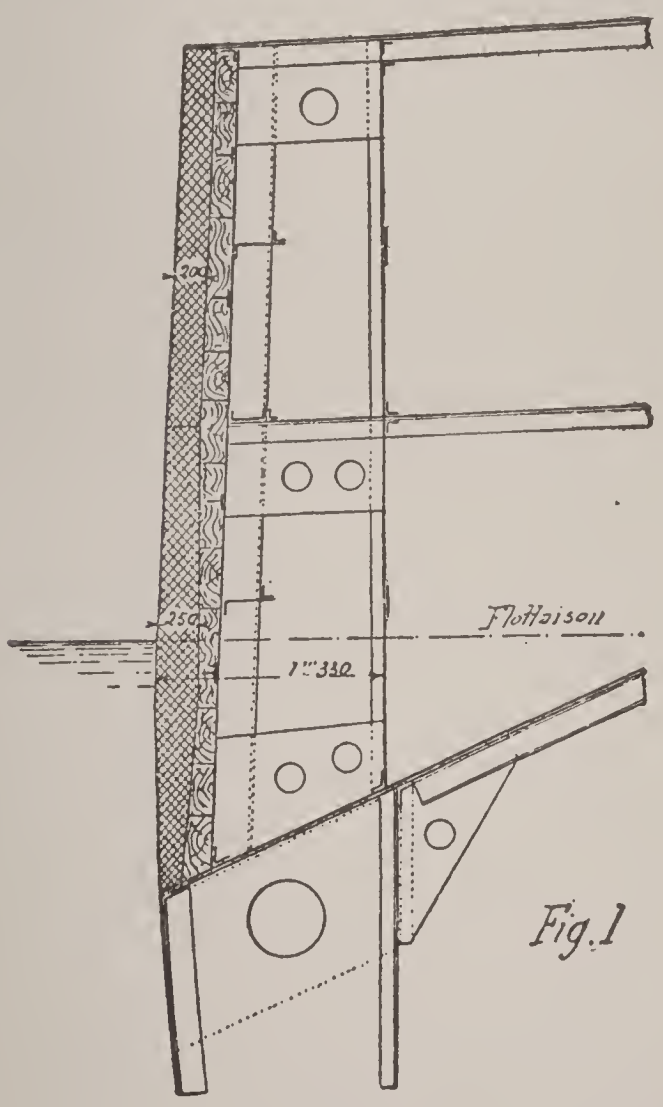
Iron and Steel-clad Vessels

sheathed from end to end in 4½-in. iron plates, an armor then considered invulnerable. The first British iron-clad, the *Warrior*, was launched in the Thames in December, 1860, an iron frigate with air-tight compartments, 4½-in. iron armor and 18-in. wood backing, the two ends of the vessel unprotected. It remained, however, for the United States to demonstrate the practical value of this new idea in naval warfare. This took place in 1862, when the first battle ever fought between iron-clad ships took place in Hampton Roads, the Confederate broadside-ship *Merrimac* engaging with the *Monitor*, the turret-ship devised by



A, Iron plating, B, Teak backing. C. Ship's side.

vessel suffered seriously and the crews escaped almost unhurt, was a practical lesson in naval warfare that overturned all older ideas and put an end to the career of wooden warships. Throughout that war the value of the new idea was abundantly proved by the use of iron-clad river boats and turreted monitors in ocean and harbor conflict, and after the close of the war the principal nations set themselves actively to work in building fleets of iron and steel-clad war-vessels. This was especially the case with England and France, the remaining nations showing much less alacrity and the United States giving little signs of following up the lesson it had taught. The American *Monitors* had proved the value of the turret method of carrying and working guns. In this the heavy guns were carried in revolving iron turrets of great strength, which rose above the deck, having openings only for the muzzles of the guns. This was quickly ap-



Steel Cement

Comparative Diagrams of Cement Armor and Steel Armor

Captain Ericsson. The result of this memorable conflict, in which neither French plied to the new British ships, while the adopted a new idea, known as

the barbette method. In this, open towers or turrets rising above the deck are employed, the heavy guns firing over the edge of the turrets, and being in some cases so mounted that they can be lifted to fire and lowered again, there being thus little danger to the crew in loading them. The principal advantage of this type was the height at which guns could be carried above the water-line; this, however, being offset by a considerable danger to guns and crews. As for the old broadside method of carrying guns, this practically vanished except in the case of the minor armament and the machine guns, which were necessarily more exposed.

The United States and Germany were later than England and France in coming into this shipbuilding contest. The United States had few iron-clads beyond its antiquated monitors, of Civil war date, until after 1883, when it began to add to its fleet of modern war vessels. In 1898, when the brief war with Spain was fought, it had a considerable number of battleships, powerful for that date, two large armored cruisers, the *New York* and *Brooklyn*, and a minor fleet of less powerful vessels. By this time steel had replaced iron as the material for plating, it had grown greatly in thickness and in hardness, while guns had also become larger and gained much greater power of penetration. The real contest between navies in size and strength has been since the opening of the twentieth century. Germany has come very actively into conflict with Britain in the endeavor to win the command of the seas, France is showing no feverish desire in this direction, while the United States has added a considerable number of very powerful vessels to its war-fleet. Other nations are following at a distance the lead of these great sea-going powers, especially Japan, which has of late years come earnestly into the field. The tendency of twentieth century warship building has been toward vessels of much heavier weight and armament, the effect being to throw the large and costly fleets of the nineteenth century into the antiquated list. This change was especially marked in 1906, when the great British battleship *Dreadnought*, of 17,900 tons and 23,000 horse-power, was set afloat, distancing in size and strength all earlier vessels. But any hope of winning supremacy by this exploit was quickly set aside, other nations coming quickly into the contest and building still larger and more powerful ships, thus forcing the island power to second its *Dreadnought* by still greater war vessels. In 1912 it had numerous ships afloat of from 19,250 to 27,000 tons displacement, their major armament consisting of 12- and 13-inch guns. Germany had at that date sixteen battleships equalling these in capacity. Japan, two of 20,750 tons and one of 27,500 tons, while the United States had two of 20,000 tons, two, the *Florida* and *Utah*, of 21,825 tons, and under contract, the *Arkansas* and *Wyoming*, of 26,000 tons, the *New York*, of 27,000, and the *Nevada* and *Oklahoma*, of 27,500 tons. Thus the contest in size and power goes on. When it will end no man can say. While war-vessels have thus been growing in size and weight, and in the piercing power of their guns, armor-plate has made like progress in powers of resistance. The early iron quickly gave way to steel, and methods of hardening steel have developed, until now the resisting powers of a steel-clad warship are enormously great. See *Navy*.

Iron Cross, a Prussian order, instituted March 10, 1813, by Frederick William III, to be conferred for distinguished services in war. It was made of iron to commemorate the grim 'iron' period at which it was created. The decoration consists of a Maltese cross of iron, edged with silver, and is worn round the neck or at the buttonhole. The order was revived by William I in 1870, on the eve of the great war with France. The grand cross, a cross double the size, is presented exclusively for the gaining of a decisive battle or the capture or brave defense of a fortress.

Iron Crown, a golden crown set with precious stones, with which anciently the kings of Italy were crowned. It has received the above name from an iron circle in it, forged, according to tradition, from a nail of the cross of Christ.

Iron Gate, a narrow part in the course of the Danube below where it leaves Austrian territory and becomes the boundary between Servia and Roumania. The water rushes through it in dangerous rapids and eddies, rendering navigation serious and formerly impossible.

Iron Hat, a headpiece of iron somewhat hat-shaped, worn as armor from the twelfth to the seventeenth century.

Iron Mask, THE MAN WITH THE, an unknown personage kept in various French prisons, who for a long time excited much curiosity. All that is known of him is that he was above middle height, of a fine and noble figure, and delicate brownish skin, that he had a pleasant voice, was well educated, and fond of reading and guitar playing, and

DECISIVE ENGAGEMENT BETWEEN THE MONITOR AND THE MERRIMAC

This encounter revolutionized naval warfare by illustrating what could be done with armored battleships.

that he died in the Bastile in 1703. The mask he wore seems to have been of black velvet, not iron. Conjecture has given him many names. He was stated to be in turn the Count of Vermandois (a natural son of Louis XIV and De la Vallière), the Duke of Beaufort, the Duke of Monmouth, the son of Anne of Austria (mother of Louis XIV) by some favorite, and twin-brother of Louis XIV, but all these assertions have been unable to stand the test of thorough investigation. What seems most probable is that he was Count Girolamo Matthioli, first minister of the Duke of Mantua, who had betrayed the interests of Louis XIV by failing to secure for him, as he had pledged himself to do, in consideration of a large bribe, possession of the fortress of Casale, which gave access to the whole of Lombardy. For this offense the court of Versailles lured him to the French frontier, secretly arrested and imprisoned him in the fortress of Pignerolo. The secret was preserved so carefully, on the supposition that Matthioli was the ill-fated prisoner, because his seizure and detention were flagrant violations of international law and likely to cause trouble.

Iron Mountain, a city of Michigan, capital of Dickinson county, 51 miles W. of Escanaba. It was organized in 1888 from part of Breitung township, has extensive iron mines and ships large quantities of excellent ore. Pop. 9216.

Irons, shackles, fetters, or bilboes for the feet, especially such as are used on board ship.

Iron-stone, a general name for ores of iron, or for some of them, as the argillaceous carbonate or clay iron-stone.

Ironton, a city, capital of Lawrence county, Ohio, on the Ohio River, 140 miles above Cincinnati. It is the center of an iron and coal district, has various iron industries, and has a large lumber trade and an extensive river commerce. Pop. 13,147.

Iron-wood, a name given to various trees from the quality of their timber. The iron-wood or hop-hornbeam of America (*Ostrya virginica*), nat. order Cupuliferæ, is a tree with a trunk not exceeding 6 in. in diameter, with very hard wood, so heavy that it sinks in water, and foliage resembling that of birch. The species of the genus *Sideroxylon*, known as iron-wood, are natives of the tropics and also of New Zealand, the Cape, etc. The *S. inerme*, or smooth iron-wood of the Cape, has long been cultivated in the greenhouses of Europe. *Diospÿros Ebĕnum* (the ebony) is also named iron-wood, as is the *Metrosidĕros vera* of Java.

Ironwood, a city of Gogebic county, Michigan, 6 miles S. W. of Bessemer. It has ironworks and lumbering industries. Pop. 12,821.

I'rony (Gr. *eirōneia*, dissimulation), a form of speech in which the meaning intended to be conveyed is contrary to the natural meaning of the words. Irony, as a rhetorical device, becomes a most effective weapon for ridiculing an antagonist. Some of the Athenian orators were great masters of this refined mode of derision.

Iroquois (ir'u-kwą), the joint name given by the French to a once powerful confederacy of six North American Indian tribes (Mohawks, Oneidas, Senecas, Onondagas, Cayugas and Tuscaroras). They formerly resided on the Mohawk River, and extended their conquests to the Mississippi and beyond the St. Lawrence. Warlike and well organized, it is probable that but for the settlement of the whites they would have secured dominion from Canada to the Gulf of Mexico. They came into early conflict with the French and proved a barrier to their southward advance from Canada. Some of the tribes are now extinct, some have made considerable advances in civilization, while others have fallen into a state of squalid misery. Part of the Canadian Indians are Iroquois.

Irradiation (ir-rā-di-ā'shun), that effect on the eye through which brilliantly illuminated white surfaces and self-luminous bodies, when emitting white light, appear to the eye much larger than they really are.

Irrational Quantities (i-rash'un-al), or SURDS, are quantities which we cannot exactly determine, because they cannot be expressed in terms of a primary unit. Thus $\sqrt{2}$ is an irrational quantity, being equal to 1.4142... with an indefinite number of decimals. The ratio of the circumference of a circle to its diameter is an irrational quantity, 3.14159...

Irrawaddy (ir-rä-wä'di), IRAWADI, a large river traversing Lower and Upper Burmah from north to south, falling into the Indian Ocean by various mouths and forming a great delta. Its source is in East Tibet. The Irrawaddy is the main artery of Burmah, the bulk of the trade is carried on by its means, the valleys through which it flows are the most fertile and populous, and on its banks are the principal towns (Mandalay, Ava, etc.), with Rangoon and Bassein on two of its mouths. The width of the river varies from 200 yards above

Ava to 1 to 4 miles towards its delta, and the total length is estimated at 1200 miles. It is navigable for steamers of 5 feet draught as far as Bhamo near the Chinese frontier, 900 miles from its mouth. The Irrawaddy Flotilla Co. possess a large number of steamers specially constructed for the navigation of this river.

Irrigation (ir-i-gā'shun), the art of increasing the productiveness of soils by the artificial supply of water to them. This is as old as agriculture, and references to it exist in very early records, especially in Egypt, India and China. In countries with very small rainfall, and subject to droughts, agriculture without irrigation would be uncertain and unprofitable. For this reason the British government has promoted extensive irrigation works in India, and, although financially a loss, they are a great boon to the agricultural population, and do much to avert those famines which were once so common among them. In Sind 80 per cent. of the cultivated area is irrigated, in the N. W. Provinces and Oudh 32 per cent. The greatest irrigation work is the Ganges Canal, 445 m. long. Irrigation has long been practised in Turkestan and it was the basis of the Babylonian kingdom of the far past. In the south of Europe, particularly in Italy and Spain, irrigation works of a high order have existed from ancient times, and it is supposed that the Romans introduced similar works into Britain, where it is extensively practised in some parts, especially for the growing of grass. In the western United States it is largely employed. This was long done by private capitalists, but in 1902 a bill was passed for the irrigation of the arid lands of the West by government aid, through the building of dams and construction of reservoirs wherever sufficient water could be had. Since that date great progress has been made in this work and large tracts of former barren lands have been irrigated and made fertile. This land is sold to settlers on easy terms, and the money thus obtained is used in extending the system. There are various systems of distributing the water in irrigation to suit the special requirements of different surfaces. The work is done by the construction of great dams, fitted to hold back the waters of mountain streams and of the melting snows of winter and feed them to the land during the farming season. There were in the United States in 1900, according to the census returns of that year, over 8,500,000 acres of irrigated lands. This has been enormously added to since that date by government operations, and it is estimated that of the vast arid tract of the West, 60,000,000 acres can be irrigated. Of this area about 13,000,000 acres had been irrigated by private enterprise up to 1910, in addition to the large area irrigated by the government works. Irrigation is also practised in the northwest section of Canada, and promises to aid in making this one of the great grain fields of the world. Irrigation has been practised on the Nile since prehistoric times and very important work has been done in this direction since the British occupation, first by the great barrage of the Nile, at Barrage, 12 miles north of Cairo, and recently by the great storage basins above Assouan, where a huge dam has been built at a cost of $24,000,000. These works add greatly to the cultivable area of Egypt. Within recent years irrigation has been largely applied in the Hawaiian Islands, adding greatly to their sugar yield. Much of this water is raised by pumps from artesian wells, some of them of remarkable capacity, they being able to lift 20,000,000 gallons 500 feet vertically in 24 hours. Similar methods are in use in parts of the Western United States. In Australia irrigation on a great scale and according to American methods has been introduced, hundreds of thousands of acres, once barren shrub, being in this way converted into luxuriant vineyards, orchards and orangeries.

Irritability (ir-i-ta-bil'i-ti), that function of a nerve or muscle in which it responds to certain stimuli, or that property in plants by which stimuli cause movements, as in the sensitive plant.

Irtish (ir'tish), a large river of Northern Asia, rises in the Altai Mountains in Chinese territory, forms Lake Zaisan, then flows N. N. W. through Asiatic Russia, and after a course of 1800 miles falls into the Obi. It receives the waters of several important rivers, and has important sturgeon fisheries.

Irvine (ėr'vin), a seaport of Scotland, in Ayrshire, on the Irvine, 24 miles southwest of Glasgow. It has a good harbor, and there are chemical works (for explosives, etc.), engineering, foundry, and shipbuilding works. Pop. 9607.

Irving (ėr'ving), EDWARD, the founder of the sect called Irvingites, was born in 1792, at Annan, Scotland; died at Glasgow, in December, 1834. He went in 1805 to the University of Edinburgh, and having entered the ministry of the Established Church, was appointed in 1819 assistant to the celebrated Dr. Chalmers in Glasgow. In 1822 he became minister of the Caledonian Asylum

CANAL OF THE TRUCKEE-CARSON IRRIGATION PROJECT

Chapel, a Presbyterian place of worship in London. His impressive eloquence, combined with singularity of appearance, and his mannerisms, soon brought him into notice, and for a time the great as well as the fashionable flocked to hear him. In 1823 he published a work called *For the Oracles of God, Four Orations*, which sold extensively. About two years later he wrote an *Introductory Essay to Bishop Horne's Commentary on the Book of Psalms*, considered one of the best products of his pen. His theological peculiarities were well set forth in a collection of *Sermons, Lectures, and Occasional Discourses*, issued at London in 1828. These attracted much attention, and brought him shortly afterwards into conflict with the presbytery, with the result, that in 1832 he was dispossessed of his living in London, and in 1833 the presbytery of Annan, which had licensed him, deposed him from the ministry. He was charged with holding Christ guilty of original and actual sin, and denying the doctrines of atonement, satisfaction, imputation, and substitution. He was a believer in the speedy coming of Christ, and held that miraculous gifts of apostolic times had not ceased to be bestowed on the Christian Church. An excellent biography of Irving was written by Mrs. Oliphant. See *Irvingites*.

Irving, HENRY, (originally John Henry Brodribb) an English actor, born in 1838. He was for a time a clerk in London, but adopted the theatrical profession, his first appearance being at Sunderland in 1856. After playing for nearly three years in Edinburgh he appeared at the Princess' Theater, London, in 1859. After a short stay here, and a few months in Glasgow, he went to Manchester, where he remained for five or six years. Having returned to London in 1866 he took part in the *Belle's Stratagem, Hunted Down, Uncle Dick's Darling*, etc.; but his first marked success was as *Digby Grant* in Albery's *Two Roses* (in 1870), which was followed by his powerful impersonation of *Mathias* in *The Bells* (founded on Erckmann-Chatrian's *Polish Jew*). His next noteworthy parts were *Charles I, Eugene Aram*, and *Richelieu*, in the plays so named. In 1874, at the Lyceum Theater, he sustained the part of *Hamlet* so successfully as to raise himself to the first place among English actors. His chief Shakesperean parts subsequently played are *Macbeth, Othello*, and *Richard III*. In 1878 he leased the Lyceum Theater for himself, and put on the stage in excellent style *Othello, The Merchant of Venice, Much Ado About Nothing, Romeo and Juliet, Twelfth Night, Faust, Macbeth*, etc., playing in them the principal character along with Miss Ellen Terry. His appearances in the English provinces were equally successful with those in London, and he met with equal favor in his repeated visits to the United States. He was knighted in 1897. Died suddenly at Bradford, England, in 1905. He was buried in Westminster Abbey.

Irving, WASHINGTON, one of the best American writers, was born in New York in 1783; died in 1859. He was the son of a Scotsman who had emigrated to New York before the Revolution, and had become a merchant of some standing. He was educated for the legal profession, but his tastes were in the direction of literature, and already in 1802 his *Letters of Jonathan Oldstyle* appeared in the *New York Morning Chronicle*. Shortly afterwards, being threatened with pulmonary disease, he sailed for Europe, visited most continental countries, and did not return to America until March, 1806. In the same year he was called to the New York bar. His pen was now very busy, and his sketches of Dutch character, in his *Knickerbocker's History of New York*, which made its appearance in December, 1809, proved him possessed of quaint and genial humor to a high degree. About this time he joined his two brothers as a sleeping partner in a mercantile venture, and in 1815 he visited England. The failure of his brothers' business made him resolve to follow literature as a profession, and he settled in London. A series of papers which he now wrote, entitled *The Sketch-book*, first published at New York, 1818, met with such success that an enlarged edition was published in London two years later. For seventeen years, until 1832, Irving resided in Europe, principally in England, France and Spain. This was a period of great literary activity and brought forth some of his most famous works, such as *Bracebridge Hall, The Tales of a Traveler*, and *The Life of Columbus*, for which 1000, 1500 and 3000 guineas respectively were paid him by the publishers. He also acted for a time as secretary to the American Embassy in London, and the University of Oxford honored him in 1831 with the degree of B.C.L. Having returned to New York in the spring of 1832 he accompanied the expedition for the removal of the Indian tribes beyond the Mississippi, and collected the material for his *Tour on the Prairies*, published in 1835. From 1842 to 1846 he acted as United States ambassador at Madrid, and on his return in that year he retired to his country-

seat at Sunnyside. His biography of *Oliver Goldsmith*, *Mahomet and His Successors*, and the *Life of Washington* (1855-56) occupied his last years. Other works of his are: *The Conquest of Granada*, *Tales of the Alhambra*, *Legends of the Conquest of Spain*, *Voyages of the Companions of Columbus*, *Adventures of Captain Bonneville* and *Astoria*. His famous story of *Rip Van Winkle* belongs to the *Sketch-book*.

Irvingites (ėr'ving-īts), a name given to believers in, and followers of, Edward Irving, forming a sect properly designated as the Catholic Apostolic Church. They have a considerable number of churches in the United Kingdom, and a few unimportant congregations exist also in Germany, France, Switzerland, Canada and the United States. Their chief distinguishing feature is the belief in a revival of the spiritual gifts of the first ages of the church, such as speaking in 'unknown tongues,' and prophesying. In their constitution, which they claim to be a development of the primitive church, they adopted the fourfold ministry of 'apostles, prophets, evangelists and pastors and teachers' (Eph., iv, 11). Two years after Irving's death the number of apostles had been completed to twelve. They recognize all Christian communities, and embody in their ritual portions of those used in different sections of the church, including the Roman and Greek Catholic. The ministry is supported by tithes. The second coming of Christ is a hope of the members.

Irvington, a town of Essex County, New Jersey, 3 miles S. W. of Newark. It has smelting works and steel, rope, and tool factories. Pop. 11,877.

Irwan. See *Erivan*.

Isaac (ī'zak; Heb. 'he will laugh'), one of the Hebrew patriarchs, the son of Abraham by Sarah, so called to denote the *laughter* and *gladness* occasioned by his birth. He is remarkable as the offspring of very old age, Sarah being ninety and Abraham a hundred years old at the time of his birth; for his miraculous escape from death as a burnt offering; and for the fraud perpetrated upon him, at his wife Rebecca's instigation, by his son Jacob, to the injury of Esau. He died at Hebron 180 years old, and was buried in the cave of Machpelah, the resting place of Sarah and Abraham, and of Rebecca.

Isaac I, COMNENUS, Emperor of Constantinople, raised to the throne in 1057. He brought about great reforms in the administration of the empire, and repelled an inroad of the Hungarians, but abdicated in favor of Constantine Ducas in 1059, and retired to a convent, where he died in 1061.

Isabella of Castile (iz-a-bel'a), daughter of King John II of Castile and Leon, consort of Ferdinand the Catholic, was born 1451, married 1469, and died 1504. She was a woman of great charms, courage, and sagacity, and contributed no small share to the many remarkable events of the reign of Ferdinand V, including the introduction of the Inquisition, 1480; the discovery of America by Columbus, 1492, to which she lent material and moral aid; and the conquest of Granada, and the expulsion of the Moors.

Isabella II, ex-queen of Spain, daughter of Ferdinand III, was born in 1830, and succeeded her father three years after, her mother being appointed queen-regent. The early years of her reign were disturbed by a rising in favor of her uncle, Don Carlos, who, if the Salic law had not been set aside, would have ascended the throne instead of her, but this was finally quelled in 1839. She was declared of age in 1843, and in 1846 was married to her cousin, Don Francisco d'Assisi. Her reign was so despotic and her life so licentious that a revolution took place in 1868, which drove her from the country. She resigned her claims to the crown in favor of her son Alfonso, who ascended the throne in 1875. She died in 1904.

Isæus (ī-sē'us), an Athenian orator, who lived between 420 and 348 B.C. He was a pupil of Lysias and Isocrates, and, like them, became a teacher of eloquence and writer of orations, chiefly judicial. Eleven of his orations are extant. His style is clear, forcible, and concise.

Isaiah (ī-zā'yȧ; Heb. *Yeshayahu*, 'Salvation of Jehovah'), the first of the great Hebrew prophets. He began his predictions in the last years of Uzziah's reign. Of his father, Amoz, we know nothing, and of the circumstances of his life but little. We know, however, that he had great influence over the kings and people of Judah, and he is supposed to have died at a good old age at Jerusalem, at the beginning of Manasseh's reign. The first portion of the writings that pass under his name consists chiefly of declarations of sin and threatenings of judgments, while the last 27 chapters, together with some previous ones, hold out promises of a glorious future for Israel. The style throughout is clear and simple, yet dignified and sublime in the highest degree. His author-

ship of the last 27 chapters is denied by some eminent critics, who unite in ascribing them to a later prophet, perhaps also called Isaiah, while others believe that the name Isaiah stands for a school of prophets; but the integrity of the book has still many able defenders.

Isar (ē'zär), a European river which rises in Tyrol, about 6 miles N. E. of Innsbruck, enters Bavaria, flows past Munich, and latterly joins the Danube; course above 190 miles.

Isatis (ī'sa-tiz), the genus of plants to which woad belongs.

Isauria (ī-sạ'ri-a), in ancient geography, a country in Asia Minor, bordering on Lycaonia, Phrygia, Pisidia, Cilicia, and Pamphylia. Its capital, Isaura, was destroyed by the Romans.

Ischia (is'ki-ä), an island of Italy, 26 square miles in extent, in the Gulf of Naples, with beautiful scenery and a fertile soil, producing excellent wine and fruits. It is entirely volcanic in character, and is noted for its warm mineral springs and volcanic convulsions. In 1881 and 1883 earthquakes caused great loss of life and property. Several shocks have been experienced since, but without disastrous results. The capital, Ischia, with some 7000 inhabitants, is a favorite resort of tourists in Italy. Other towns are Casamicciola and Forio, both of which suffered severely in 1883. Pop. 26,891.

Ischium (is'ki-um), the inferior posterior part of the pelvic arch in vertebrates; a part of the hipbone.

Ischl (ē'shl), a fashionable watering place in Upper Austria, on the Traun, 50 miles S. W. of Linz, celebrated for its salt baths. The Austrian emperor has a residence in the neighborhood. Pop. of commune, 9646.

Iseo (ē-sā'ō), or SABINO, a picturesque lake in Upper Italy, between Brescia and Bergamo, and formed by the waters of the Oglio; length 15 miles; average breadth 6 miles.

Isère (ē-sār), a river which rises in Italy, crosses Savoy, enters France by the department of Isère, to which it gives its name, and joins the Rhone 5 miles above Valence; length about 190 miles, of which nearly 90 are navigable.

Isère, a department of Southeastern France; area 3185 square miles. It is generally mountainous, the highest summit being Le Grand Pelvoux, 13,158 feet. The whole department belongs to the basin of the Rhone, which drains a great part of it directly, the only other important river being the Isère. The soil is generally fertile, and produces abundant cereal and leguminous crops; the vine and mulberry being also cultivated. Lead, copper, and iron are found in considerable quantities; also coal, marble, slate, granite, and porphyry, and the iron mines employ a number of blast furnaces. There are numerous paper, silk, and cotton mills. Grenoble is the capital. Pop. 562,315.

Iserlohn (ē'zėr-lōn), a town of Prussia, province of Westphalia, with manufactures in brass, bronze, tin, and iron, cutlery, zinc and iron furnaces, etc. Pop. 27,265.

Isernia (ē-zer'nē-ä; Latin, *Æsernia*), an episcopal city of South Italy, on a spur of the Apennines, province Campobasso. Pop. 9322.

Ishim (ish-em'), a river of Western Siberia, a tributary of the Irtish.

Ishmael (ihs'mā-el; Hebrew, *Yishmael*, 'Whom God hears'), the son of Abraham by Hagar. He married an Egyptian wife, and had twelve sons and one daughter, who became the wife of Esau. He died when 137 years old. It was predicted that he was to become 'a great nation,' and the Arabs, especially the Bedouins, are often regarded as descendants of Ishmael.

Ishmaelites (ish'māl-itz), ISHMEELITES, the descendants of Ishmael. See *Ishmael.*

Ishmaelites, ISMAELITES, or ISMAELIANS, a Mohammedan sect originating in the first century of the Hegira, and deriving its name from Ishmael or Ismael, one of Ali's descendants. From the eighth to the twelfth century they were powerful in the East, and distributed themselves over Irak, Syria, Persia, and Egypt.

Ishpeming (ish'pē-ming), a city of Marquette county, Michigan, 15 miles N. W. of Marquette. There are extensive iron mines, with very rich ore. There are smelting furnaces, machine shops, powder works, etc. Pop. 12,448.

Isidore (īz'i-dōr), the name of three Spanish ecclesiastics, of whom the most famous was Isidore of Seville, who flourished at the beginning of the seventh century. He was the most profound scholar, the most eloquent orator, and the ablest prelate of his age and country, and consequently exercised a powerful influence over the development of Latin Christianity. He was made bishop of Seville in 600 or 601, presided over the Councils of Seville, 619, and Toledo, 633; and died at Seville in 636. Several of his works, which embrace

divinity, history, philosophy, etc., were translated into English as early as the middle of the sixteenth century.

Isidorian Decretals, a spurious collection of decretals belonging to the ninth century, which were for a long period regarded as authentic. See *Decretals.*

Isinglass (ī'zing-glas), a gelatinous substance, of which the best kind is prepared from the swimming bladder or sound of the sturgeon, dried and cut into fine shreds, while the American article is obtained from the same part in the cod, hake, etc. It is the basis of the Russian glue, which is preferred to all other kinds for strength. A test solution is also prepared from it, by means of which tannic acid may be distinguished and separated from gallic acid, the former giving it a yellowish-white precipitate. Isinglass boiled in milk forms a nutritious jelly, and a solution in water, with a very small proportion of some balsam, spread on black silk, is the court plaster of the shops. It is also used in fining sherries and other white wines, and in making mock pearls, stiffening linens, silks, gauzes, etc. With brandy it forms a cement for porcelain and glass.

Isis (ī'sis), the principal goddess of the Egyptians, the sister and wife of Osiris, representing the moon, as Osiris did the sun. The Egyptians believed that Isis first taught them agriculture, and as the Greeks offered the first ears gathered to Ceres, so did the Egyptians to Isis. She is represented under various forms. In one representation she has the form of a woman, with the horns of a cow, as the cow was sacred to her. She is also known by the attributes of the *lotus* on her head, and the *sistrum* in her hand, a musical instrument which the Egyptians used in the worship of the gods. She is often accompanied by her infant son, Horus. In one celebrated Egyptian statue she was shown with her face veiled. She was particularly worshiped in Memphis, and at a later period throughout all Egypt. From Egypt her worship passed over to Greece and Rome, and the abuses which it occasioned at Rome caused its frequent prohibition there. It was, however, repeatedly revived. The Romans never considered the worship, which was introduced among them by Sulla (B.C. 86), altogether reputable, and its attendant immorality was vigorously lashed in the satire of Juvenal.

Isis.

Isis, a kind of coral, popularly known as *Marc's-tail* coral, from its likeness to the plant of that name (*Hippūris*). It is found chiefly in the Indian Seas, in the Pacific Ocean, and on the coasts of America.

Isis, the upper part of the river Thames, before its junction with the Thame.

Iskanderoon (is-kän-di-rön'), or Iskenderoon. See *Alexandretta.*

Isla (ēs'lä), José Francisco de, born at Segovia in 1714; died at Bologna in 1783; a Spanish satirist after the model of Cervantes. His fame rests principally upon his *History of Fray Gerundio*, a satire on the monks of his time, a book which fell under the ban of the Inquisition. He translated *Gil Blas* into Spanish.

Isla de Pinos ('Isle of Pines'), an island lying south of the western portion of Cuba, to which it belongs, 40 miles by 34, with good pastures and valuable timber. The American residents sought to have it annexed by the United States, but this was officially repudiated in 1905.

Islam (is-läm'), that is, complete resignation and submission to the will of God, is the name given in Arabic to the religion originated by Mohammed. The fundamental doctrine of Islamism, and the only one it is necessary to profess to be a Moslem, is expressed in the common formula of faith: 'There is no God but Allah, and Mohammed is his prophet,' to which the Shiahs or Shiites, that is, the majority of Persian and Indian Moslems, add 'and Ali is the vicar of God.' See *Mohammedanism.*

Island (ī'land), a portion of land entirely surrounded by water, and smaller in size than the great masses of land known as continents. Islands are of all sizes, from mere dots of land or rock in the sea to a great mass like Australia, which is often spoken of as a continent. Islands are divided into two distinct classes: *continental* islands, lying in proximity to continents, and *pelagic* or *oceanic*, from their position in the oceans. Continental islands occur along the margin of the continents, and are generally of the same geological structure. Pelagic islands are mostly of volcanic or coral formation. A cluster of islands, such as

the West Indies, the Canaries, the Hebrides, etc., are called an *archipelago.*

Islands of the Blessed, according to the Grecian mythology, islands which were supposed to lie westward in the ocean, where the favorites of Zeus, snatched from death, lived in perpetual happiness.

Islay (ī'lā), an island of Scotland, one of the Inner Hebrides, forming part of Argyleshire, and separated by the Sound of Islay from the island of Jura. It is 25 miles long by 17 miles broad; area, 150,000 acres. The coast is mostly bold and rocky, and the north and east of the island are hilly. There are extensive fertile tracts under tillage, producing good crops of grain, turnips, and potatoes. Cattle, sheep, horses, cheese, butter, and other agricultural produce are exported, as also large quantities of whiskey, which are sent chiefly to Glasgow. Pop. 6891.

Islay (is'lī), a seaport of Peru. Pop. about 2000.

Isle of France (īl). See *Mauritius.*

Isle of Man. See *Man.*

Isle of Pines, a small island in the Pacific, southeast of New Caledonia, and forming a dependency of it.

Isle of Wight. See *Wight.*

Islington (īz'ling-tun), a district in the north of London, since 1885 a parliamentary borough returning four members. Pop. (1911) 327,423.

Ismaelites, a Mohammedan sect. See *Ishmaelites.*

Ismail (is'mȧ-il), a town in the south of Russia, gov. of Bessarabia, on the north arm of the Danube, 35 miles E. of the Roumanian port Galatz, and about 40 from the embouchure of the Danube in the Black Sea. It was destroyed by Suwarrow in 1790, and since then has been alternately governed by Turkey and Russia, ultimately falling under the dominion of the latter by the Treaty of Berlin in 1878. It has recently made rapid strides, both architecturally and commercially, and is now an important market for wool, hides and leather, corn, and tallow. Pop. 31,293.

Ismailia (is-mȧ-ē'lē-ȧ), a small town in Egypt, on the salt lake Timsah, on the route of the Suez Canal, and at the outlet of a branch of the fresh-water canal (from the Nile to Sueź), 46 miles south of Port Said. It was built during the making of the Suez Canal, and became the headquarters of the Canal Company. It was laid out in 1863. Pop. (1907) 10,373.

Ismid (is-mēd'), IZMID, a town of Asia Minor, on the Sea of Marmora, seat of a Greek metropolitan and an Armenian archbishop. It represents the ancient Nicomedia. Pop. 20,000.

Isnik. See *Nicæa.*

Isobaric Lines (i-su-bȧr'ik), lines drawn on a map or globe through all places where the barometer is at the same height at a certain time. Telegraphic communication enables these lines to be drawn with some accuracy.

Isocheimal Lines. See *Isothermal Lines.*

Isochronism (ī-sok'run-izm; Gr. *isos,* equal; *chronos,* time), the property by which a pendulum, or a balance wheel, or an oscillating particle (as of air) conveying sound vibrates through longer or shorter arcs in the same time (or nearly so). Given a certain length of spring, all the vibrations, large or small, are isochronous. If the spring is shortened the large vibrations take place quicker than the short ones; if, on the contrary, the spring is lengthened, the small arcs are performed quicker than the large ones. For small oscillations a pendulum is almost exactly isochronous, but it is only with the cycloidal pendulum that perfect isochronism is obtained.

Isoclinic Lines (ī-su-klī'nik). See *Isogonic Lines.*

Isocrates (ī-sok'ra-tēz), an ancient Greek orator, born at Athens 436 B.C. He spoke seldom in public; but he prepared orations for others, and trained many able orators, among his pupils being Isæus, Hyperides, Lycurgus, etc. His patriotism was sincere, and his desire for the freedom of Greece so intense that he starved himself to death in his ninety-eighth year from grief at the unhappy battle of Cheronæa. He was master of a graceful literary prose style, but was accused of being too florid and of carrying elaboration too far, his periods being formed with endless labor. Twenty-one of his orations are still extant.

Isogonic Lines (ī-su-gon'ik), lines drawn on a map through all places where the declination of the magnetic needle is the same. *Isoclinic lines* are drawn through places where the inclination or dip of a magnetic needle is the same; the zero isoclinic line (drawn through places where there is no dip) is called the magnetic equator.

Isŏla Bella (ē'zō-lä), one of the Borromean Islands in Lake Maggiore. See *Borromean Islands.*

Isŏla Grossa, a long, narrow island in the Adriatic, on the coast of Dalmatia.

Isŏla Madre, one of the Borromean Islands (which see).

Isomerism (ī-som'ĕr-izm; Gr. *isos*, equal; *meros*, a part), literally equality of parts, a chemical term first applied by Berzelius in the case of bodies which, although identical in composition, that is, as regards number and nature of atoms, have nevertheless different chemical properties. It is supposed to be due to different grouping of the atoms of each molecule, or to the varying amount of energy employed in its formation.

Isomorphism (ī-su-morf'izm; Gr. *isos*, equal, *morphē*, form; that is, 'equality in form'), is the phenomenon observed where chemical bodies composed of different elements, but equal in atomic quantity and combination, affect the same crystalline form. It was formerly supposed that every substance had its own peculiar crystalline form. Mitscherlich, however, showed that certain elements or groups of elements may replace one another in salts without altering the crystalline form of the compound.

Isonandra (is-o-nan'dra), a genus of plants, order Sapotaceæ, one species of which, *I. gutta*, is known as the gutta-percha tree.

Isoperimetrical (ī-so-per-i-met'ri-kal), in geometry, a term applied to figures which have equal circumferences or perimeters.

Isopoda (ī-sop'o-da; Greek, *isos*, equal; *pous*, *podos*, foot), an order of crustaceans having sessile eyes and a depressed body; the thoracic and abdominal rings free, except the first thoracic, which is united with the head. The feet are of equal size and move in the same direction. The Isopoda vary widely in habits; some, like the wood-lice, are terrestrial, and inhabit damp situations, such as under stones, and moss, and under the bark of trees; others live as parasites on fishes, and in the gill chambers or on the outer surface of shrimps, crayfish, and other higher crustaceans; and while some forms are exclusively marine, others inhabit fresh water.

Isothermal Lines (ī-su-ther'mal), lines drawn on a map or globe through places which have the same mean annual temperature. (See *Climate.*) *Isotheral* lines are drawn through places having the same mean temperature during the hottest month of the year. *Isoeheimenal* or *Isocheimal* lines are drawn through places having the same mean temperature during the coldest month in the year.

Ispahan (is-pȧ-hän') or ISFAHAN, a very ancient city of Persia, and for centuries its capital, in the province of Irak-Ajemi, on the river Zendarud, 210 miles south of Teheran, the present Persian capital. It was once one of the

Mosque of Sultan Hussein, Ispahan.

most important and magnificent cities in the East, but little is now left of its former splendor, the largest part of the city being in ruins. The manufactures are still extensive, however, including trinkets, firearms, sword-blades, glass, earthenware, artistic brasswork, woolens, cottons, velvet, and satin. Much opium is grown in the neighborhood, as also tobacco, madder, etc., forming important articles of trade. Ispahan is the emporium of the inland commerce of Persia. Pop. about 80,000, not more than one-tenth its former population.

Israel, and ISRAELITES. See *Jews.*

Issik-kul, Issyk-kul (is-sik-köl'), a lake of Central Asia, in the Russian province of Semirechensk, south of Lake Balkhash, about 110 miles long by 36 broad, with brackish water abounding in fish. It receives many streams, but is gradually decreasing in size.

Issoire (is-wär), a French town, department of Puy-de-Dôme, 19 miles S. S. E. from the departmental capi-

tal, Clermont. Manufactures articles in copper, and has numerous oil-mills. Pop. (1906) 5274.

Issoudun (is-ö-dūṇ), a French town, department of Indre, 17 miles N. E. of the departmental capital, Châteauroux. It has manufactures of steam engines, agricultural implements, woolens, cottons, etc. Pop. (1906) 10,566.

Issue (ish'ū), in law, the point or matter depending in a suit on which two parties join and put their cause to trial. It is a single, definite, and material point issuing out of the allegations of the parties, and consisting regularly of an affirmative and negative. It is either an *issue in law* to be determined by the court, or *in fact* to be ascertained by a jury.

Issus (is'sus), anciently a town of Cilicia, in Asia Minor, on the Gulf of Issus. Here Alexander of Macedon gained a complete victory over Darius (B.C. 333).

Issy (ē-sē), a suburban quarter in the southwest of Paris, with a strong fort.

Istambol. See *Constantinople.*

Istar (is'tar), the ancient Babylonian god of war and destruction.

Isthmian Games (ist'mi-an), public games of ancient Greece, so called because they were celebrated on the Isthmus of Corinth, and having a similar character to the Olympian, Nemean, and Pythian games. The Greeks in general took part in them, and the principal exercises were boxing, wrestling, foot, horse, and chariot races, and throwing the discus. They were celebrated in April and May, in the first and third year of each Olympiad, and the victors were rewarded with wreaths of pine leaves. The origin of these games is lost in antiquity, but they were generally regarded as originated in honor of Poseidōn (Neptune). See *Games.*

Isthmus (ist'mus, is'mus), in geography, a neck of land by which two continents are connected, or a peninsula is united to the mainland. Such are the *Isthmus* of Panama, connecting North and South America, and the *Isthmus* of Corinth, connecting the Morea with Northern Greece.

Istria (is'tri-a), a peninsula of triangular form, projecting into the northeast corner of the Adriatic Sea, part of the Austro-Hungarian Dominions. The surface is mountainous, particularly in the north. The soil is generally thin and gravelly, but the forests, which are extensive, yield excellent timber, and the vine, olive, and mulberry are successfully cultivated. Area, 1900 square miles. Pop. 344,173.

Italy (it'a-li), a kingdom in Southern Europe, consisting in the main of a large peninsula, having a singular resemblance to a boot in shape, stretching southwards into the Mediterranean, but also including a considerable portion of the mainland and the islands of Sicily, Sardinia, Elba, Ischia, Lipari Islands, etc. It is bounded on the north and northwest by the Alps, which separate it from Austria, Switzerland, and France, and on the northeast by Austria; elsewhere it is washed by the Mediterranean, or the Adriatic, an arm of the latter. The area is about 114,000 square miles. For administrative purposes it is divided into sixty-nine provinces, which are grouped under sixteen departments (*compartimenti territoriali*), some of them consisting of only a single province. The following table furnishes a list of the departments, with their area and population:—

Departments.	Area in sq. m.	Est. Population.
Piemonte (Piedmont)	11,332	3,326,311
Liguria	2,039	1,080,944
Sardinia (Island)	9,399	789,374
Lombardia (Lombardy)	9,075	4,278,188
Venetia	9,059	3,130,429
Emilia	7,921	2,451,752
Marca (The Marches)	3,746	1,064,749
Umbria	3,719	644,367
Toscana (Tuscany)	9,287	2,548,154
Roma (Rome)	4,601	1,206,354
Abruzzi e Molise	6,669	1,442,365
Campania	6,948	3,142,373
Calabria	6,663	1,375,760
Sicilia (Sicily)	11,289	3,529,266
Apulia	8,541	1,942,423
Basilicata	4,122	490,000
Kingdom of Italy	114,410	32,449,754

From 1861, when the Kingdom of Italy was constituted, until 1865, Turin was the capital, Florence was then selected, and in 1871 Rome. The largest town is Naples; next in order are Milan, Rome, Turin, Palermo, Genoa, Florence, and Venice. The only foreign possessions are Eritrea, the Dhalak Islands, on the Red Sea coast of Africa, and Italian Somaliland, on the Indian Ocean coast south of the Gulf of Aden.

Physical Features.—Among the principal physical features of Italy are the Alps, on its northern frontiers, and the chain of the Apennines, which run down the middle of the peninsula through its whole length to the Straits of Messina, while numerous branches are thrown off laterally, and form an endless succession of wooded hills, olive-clad slopes, and fertile valleys. In the north, enclosed

between the ranges of the Alps and Apennines, is a vast and fertile plain, intersected by the Po and its tributaries. Two active volcanoes belong to the kingdom, Vesuvius in South Italy and Etna in Sicily. The eastern shore of Italy is generally flat and uninteresting, presenting particularly along its northern part a series of sandy islands and lagoons, which dam up the mouths of the rivers, and occasion the formation of pestilential marshes. On the west coast the same thing is occasionally seen, as in the case of the Pontine Marshes and the Tuscan Maremma; but as a rule the west coast is more elevated, and often presents delightful scenery, as round the Gulf of Genoa and the Bay of Naples. The only river of any magnitude is the Po, which has a length of about 450 miles before it enters the Adriatic. It is fed by streams both from the Alps and the Apennines, the Ticino, Adda, Oglio, etc., from the former, the Trebbia, Secchi, etc., from the latter. The Adige (in Germany, the Etsch) has its mouth at no great distance from the Po, and is partly fed in the same way. In the peninsular part of Italy are the Arno, Tiber, Garigliano, Volturno, etc. There are a number of lakes, of which the most important are Lakes Maggiore, Lugano, Como, and Garda in the Alpine region; Lakes Trasimeno, Bolsena, and Albano in the Apennine region. Italy is rich in useful minerals, but the scarcity of coal prevents the full development of mining industry. Sulphur, salt, iron, and marble are the chief, though small quantities of lead, copper, zinc, silver, and borax are also obtained.

Climate.—In the south of Italy the climate resembles that of Africa, being dry and burning and subject to the sirocco. In the northern regions, the neighborhood of the Alps, and the abundance of water-courses, serve to maintain a pleasant temperature. Yet this region is at times extremely cold, especially in the interior of the great plains. In general the climate of Italy is healthy, except marshy districts such as the rice plantations of Lombardy, the Tuscan Maremma, the Campagna of Rome, and the Pontine Marshes, which give rise to exhalations engendering fevers. The Riviera or coast of the Gulf of Genoa is a favorite winter resort from more northern regions.

Vegetable Products, Agriculture.—The natural productions of the soil of Italy are as various as its climate. In the Alpine regions all plants belonging to temperate climates flourish, while the southern regions possess almost a tropical flora. Agriculture forms the chief support of the population, and the land, where not mountainous, is generally productive, although the system of culture adopted is in most parts defective, and large areas remain untilled. The best cultivation, aided by an excellent system of irrigation, is found in Lombardy, Venetia, Piedmont, Tuscany, and the parts of Emilia adjoining the Po. Most kinds of cereals, including rice and maize, are cultivated, and the wheat in particular is of fine quality, but is not sufficient for the home consumption. Hemp, madder, flax, tobacco, hops, saffron, and, in the extreme south, cotton and sugar-cane are cultivated. Fruits are the object of attention everywhere; and in the cultivation of the olive in particular Italy surpasses all other European states. The fruits include oranges and lemons in the warm regions of the south, besides figs, peaches, apricots, almonds, etc. There is a very large production of wine, but only a few of the wines have any reputation in other countries. The rearing of live-stock is an important industry. The cheese of Italy is famous, especially the Gorgonzola and the Parmesan.

Manufactures.—Since the consolidation of the Italian kingdom, the manufactures of the country have made considerable advances. The most important of these are the silk manufactures, Italy as regards the production of raw silk being in advance of all the other countries of Europe. Lombardy, Piedmont, and Venetia are the great centers for its preparation. Nearly 3,000,000 spindles are employed in spinning. The weaving is less developed. The cotton manufactures are also centered in Upper Italy, chiefly in Lombardy, and have much increased of late. Woolen manufactures are also chiefly carried on in Upper Italy. In the iron industry the department of Lombardy stands at the head; more particularly the provinces of Brescia, Como, and Milan. Tanning, the manufacture of linen, of paper, gold and silver wares, articles in bronze, musical instruments, the making of gloves, boots and shoes, felt and silk hats, are also considerable industries. The manufacture of tobacco is a state monopoly. Of special repute are the cameos and mosaics of Rome, Naples, and Florence; the filigree and coral work of Genoa; the plaited straw and the earthenware manufactures of Italy generally.

Trade.—The foreign trade is mainly with France and Algeria, Great Britain, Austria, and Germany. The chief imports are wheat, raw cotton, and cotton manufactures, coal, iron and machinery,

ITALY

Scale of Miles

0 10 20 30 40 50 100

Railroads ---- ———

Size of type indicates relative importance of places

The Kingdom of Italy is divided into 69 Provinces, of which boundaries are shown and capitals of same are designated thus: ⊙ ; name of Province is in all cases the same as capital town. The larger divisions, known as Compartimenti are not now recognized as legal divisions.

SWITZERLAND

AUSTRIA-HUNGARY

FRANCE

TYRRHENIAN SEA

ADRIATIC SEA

IONIAN SEA

MEDITERRANEAN SEA

ALGERIA

TUNIS

AFRICA

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wool, sugar, coffee; the chief exports, raw silk, olive oil, wine, fruits, eggs, coral, hemp, marble, rice, sulphur. The principal ports are Genoa, Leghorn, Messina, Naples, Palermo, Venice, Brindisi and Catania. The total length of railways opened for traffic in 1910 was about 11,000 miles; of telegraph lines, 40,000 miles, nearly two-thirds of the whole belonging to the government.

Constitution and Government.—The constitution of the Kingdom of Italy is a limited monarchy, based upon the Fundamental Statute granted by King Charles Albert to his Sardinian subjects March 4, 1848. The king, who is hereditary, exercises the power of legislation only in conjunction with a national parliament, consisting of two chambers. The first chamber is called the senate, and is composed of the princes of the blood, and an indefinite number of members appointed for life by the king. The second chamber is called the chamber of deputies, and consists of 508 members, who are elected by a majority of all the citizens above twenty-one years of age who are in the enjoyment of civil and political rights. Each province has the right of independent administration, and the executive power is intrusted to a provincial council. In each province the power of the state is represented by a prefect, who is supported by a council. The executive power of the state is exercised by the king through responsible ministers. In 1908 the budget estimates were, total revenue, $400,088,630; expenditure, $389,185,000; public debt, $2,545,000,000.

Army and Navy.—All men capable of bearing arms are under obligation of military service from their twenty-first to the end of their thirty-ninth year. Of the young men of the age of twenty-one, 80,000 are levied annually for the standing army, while the rest are entered in the army of reserve. In 1910 the strength of the standing army on the war footing was in all 1,043,000; the number unorganized but available for duty was estimated at 1,200,000, making the total for the whole military service 2,243,000. The navy was made up of 13 battleships and 22 cruisers, with a large number of torpedo boats and destroyers.

Religion and Education.—The Roman Catholic is the state religion, but all other creeds are tolerated, and adherents of all religions have equal municipal and political rights. The pope has his seat at Rome, and his palaces of the Vatican and the Lateran, and his villa of Castel Gandolfo, are not under the jurisdiction of the state. In 1861 the law annihilating ecclesiastical jurisdiction and the privileges of the clergy was extended to the whole of the kingdom, and in 1866 a bill was passed for the suppression (with certain exceptions) of religious houses throughout the kingdom. Elementary education is nominally compulsory, and is entirely supported from the municipal rates; but the number who can neither read nor write still remains very large. For secondary instruction there are a large number of gymnasia and technical schools, and for the higher education there are no less than twenty-one universities, many of them of ancient foundation, and at one time of considerable renown. The oldest are those of Bologna (founded in 1119), Padua (1228), Naples (1224), Rome (1244), Perugia (1320), Pisa (1329), Siena (1349), Pavia (1390), Turin (1412), and Parma (1422).

Money, Weights, and Measures.—The present monetary system of Italy is the same as that of France, the lira being equal to the franc, and divided into 100 centesimi, as the franc is into 100 centimes. The lira is accordingly equal to about 19 cents. The weights and measures of Italy have also been adopted from France, with only such modifications in their names as are necessary to give them an Italian form.

History.—The ancient history of Italy will be found under *Rome*. The modern history begins with 476 A.D., when Odoacer, chief of the Herulians, a German tribe which had invaded the country, was proclaimed king of Italy. After a reign of twelve years he and his followers were overpowered by the Ostrogoths under Theodoric the Great. The Ostrogoths were in turn subdued by Byzantine troops, and Italy came under the dominion of the Eastern emperors, who ruled through an exarch residing at Ravenna. In 568 the Lombards (Langobardi), a German people originally from the Elbe, led by their king, Alboin, conquered the Po basin, and founded a kingdom which had its capital at Pavia. The kingdom of the Lombards included Upper Italy, Tuscany, and Umbria, with some outlying districts. But on the northeast coast the inhabitants of the lagoons still retained their independence, and in 697 elected their first doge, and founded the republic of Venice. (See *Venice.*) Ravenna, the seat of the exarch, with Romagna, Rimini, Ancona, and other maritime cities on the Adriatic, and almost all the coasts of Lower Italy, remained unconquered, together with Sicily and Rome. The slight dependence of this part of Italy on the court of Byzantium disap-

peared almost entirely in the beginning of the eighth century. The power of the pope, though at first recognized only as a kind of paternal authority of the bishop, grew steadily in these troubled times, especially in the struggle against the Lombard kings. In consideration of the aid expected against King Astolphus, Pope Stephen III (754) not only anointed the king of the Franks, Pepin, but appointed him patrician or governor of Rome. In return Pepin presented the exarchate of Ravenna, with the five maritime cities, to the pope, thus laying the foundation of the temporal power of the holy see. At the invitation of Pope Hadrian I, Charlemagne made war upon Desiderius, the king of the Lombards, took him prisoner in his capital, Pavia (774), and united his empire with the Frankish monarchy. Italy, with the exception of the duchy of Benevento and the republics of Lower Italy, thus became a constituent part of the Frankish monarchy, and the imperial crown of the West was bestowed on Charlemagne (800). On the breaking up of the Carlovingian empire Italy became a separate kingdom, and the scene of strife between Teutonic invaders. At length Otto the Great was crowned emperor at Rome (961), and the year after became emperor of what was henceforth known as the Holy Roman Empire.

During the following centuries the towns and districts of North and Middle Italy gradually made themselves independent of the empire, and either formed themselves into separate republics or fell under the power of princes bearing various titles. A large part of Middle Italy at the same time was under the dominion of the popes, including the territory granted by Pepin, which was afterwards enlarged on several occasions. In Southern Italy there were in the time of Charlemagne several independent states. In the ninth century this part of the peninsula, as well as Sicily, was overrun by Saracens, and in the eleventh century by Normans, who ultimately founded a kingdom which embraced both Lower Italy and Sicily, and which, though it more than once changed masters, continued to exist as an undivided kingdom till 1282. In that year Sicily freed herself from the oppression of the then rulers, the French, by the aid of Pedro of Aragon (see *Sicilian Vespers*), and remained separate till 1435. It was again separate from 1458 to 1504, when both divisions were united with the crown of Spain. With Spain the kingdom remained till 1713, when Naples and Sicily were divided by the Treaty of Utrecht, the former being given to Austria, the latter to the Duke of Savoy. In 1720 they were again united under Austria, but in 1734 were conquered from Austria and passed under the dominion of a separate dynasty belonging to the Spanish house of Bourbon. See *Sicilies, Kingdom of the Two.*

The history of mediæval Italy is much taken up with the party quarrels of the Guelfs and Ghibellines, and the quarrels and rivalries of the free republics of Middle and Upper Italy. In Tuscany the party of the Guelfs formed themselves into a league for the maintenance of the national freedom under the leadership of Florence: only Pisa and Arezzo remained attached to the Ghibelline cause. In Lombardy it was different, Milan, Novara, Lodi, Vercelli, Asti and Cremona formed a Guelf confederacy, while the Ghibelline league comprised Verona, Mantua, Treviso, Parma, Placenza, Reggio, Modena and Brescia. Commercial rivalry impelled the maritime republics to mutual wars. At Meloria the Genoese annihilated (1284) the navy of the Pisans, and completed their dominion of the sea by a victory over the Venetians at Curzola (1298). See *Pope, Genoa, Florence,* etc.

Up till the time of the Napoleonic wars Italy remained subject to foreign domination, or split up into separate republics and principalities. The different states were bandied to and fro by the chances and intrigues of war and diplomacy between Austria, Spain and the House of Savoy. During the career of Napoleon numerous changes took place in the map of Italy, and according to an act of the Congress of Vienna, in 1815, the country was parceled out among the following states:—(1) The Kingdom of Sardinia, consisting of the island of Sardinia, Savoy, and Piedmont, to which the Genoese territory was now added. (2) Austria, which received the provinces of Lombardy and Venetia, these having already been acquired by her either before or during the time of Napoleon. (3) The Duchy of Modena. (4) The Duchy of Parma. (5) The Grandduchy of Tuscany. (6) The Duchy of Lucca. (7) The States of the Church. (8) The Kingdom of the Two Sicilies. (9) The Republic of San Marino. (10) The Principality of Monaco. The desire for union and independence had long existed in the hearts of the Italian people, and the governments at Naples, Rome, Lombardy, and other centers of tyranny were in continual conflict with secret political societies. The leading spirit in these agitations in the second quarter of the nineteenth century was Giuseppe Mazzini,

who in the end contributed much to the liberation of his country. The French Revolution of 1848 brought a crisis. The population of Lombardy, Venetia, Parma, and Modena took up arms and drove the Austrian troops in retreat to Verona. Charles Albert, King of Sardinia, then declared war against Austria, and was at first successful, but his forces were severely defeated at Novara (March, 1849), when Charles Albert abdicated in favor of his son, Victor Emmanuel. Meanwhile the pope had been driven from Rome, and a Roman republic had been established under Mazzini and Garibaldi, the leader of the volunteer bands of Italian patriots. Rome was, however, captured by the French, who came to the aid of the pope (July, 1849), who resumed his power in April, 1850, under the protection of the French, and the old absolutism was restored. Similar attempts at revolution in Sicily and Naples were also crushed, but the secret societies of the patriots continued their operations. In 1859, after the war of the French and Sardinians against Austria, the latter power was compelled to cede Lombardy to Sardinia, and in the same year Romagna, Modena, Parma, and Piacenza were annexed to that kingdom, which was, however, obliged to cede the provinces of Savoy and Nice to France. In the south the Sicilians revolted, and supported by a thousand volunteers, with whom Garibaldi sailed from Genoa to their aid, overthrew the Bourbon government in Sicily. Garibaldi was proclaimed dictator in the name of Victor Emmanuel. In August Garibaldi crossed to Naples, defeated the royal army there, drove Francis II to Gaeta, and entered the capital on September 7th. Sardinia intervened and completed the revolution, when Garibaldi, handing over his conquests to the royal troops, retired to Caprera. A plebiscite confirmed the union with Piedmont, and Victor Emmanuel was proclaimed King of Italy, thus suddenly united almost, in Mazzini's phrase, 'from the Alps to the sea.' Only the province of Venice and the Roman territory still remained outside. The former was won by Italy's alliance with Prussia in 1866 against Austria. The temporal power of the pope was still secured by French troops at Rome, till the French garrison was withdrawn at the outbreak of the Franco-German war in 1870, when Italian troops took possession of the city in the name of King Victor Emmanuel. On June 30, 1871, the seat of government was formally removed from Florence to Rome. In 1878 Victor Emmanuel died, and was succeeded by his son, Humbert I, under whom the general history of the country was uneventful. Bank scandals drove the Giolitti ministry from office in 1893, and Signor Crispi was invited by King Humbert to form a new cabinet. In 1896, attempting to establish a protectorate over Abyssinia, the Italians were defeated with great loss, and Crispi was succeeded by Marquis di Rudini. Humbert was assassinated July 29, 1900, and was succeeded by his son as Victor Emmanuel III. Until the advent of the Young Turks to power in Turkey, the foreign policy of Italy meant Austria only; but on September 20, 1911, Italy declared war against Turkey, claiming that all enterprise on the part of Italians in Tripoli had been systematically crushed. The Italians soon held all the coast-line from Tunis to the borders of Egypt.

Italy, Literature of.—The Italian language is one of the Romance tongues, or tongues derived from the Latin, and is therefore a sister of French, Spanish, and Portuguese. It is derived not from the literary language of Rome as we know it, but from the old popular dialect or *Lingua Romana rustica.* German races contributed words to its vocabulary. Latin kept its place so long here in its natural home that the new popular speech was slow to develop; and in fact the earliest literary products of Italy are poems written in the Provençal and French languages. But about the close of the thirteenth century native poets arose, who indeed imitated the Provençals as to the form of their compositions, but wrote in their own language. Among the most important of these early poets is the Florentine, Guido Cavalcanti (died 1300), who contributed much to the development of Italian language and poetical style. But the great luminary of this period, and by far the greatest poetic genius which Italy has produced, was Dante (1265-1321). (See *Dante.*) In Italian prose the oldest book is Ristoro d'Arezzo's *Composizione del Mondo*, written about the middle of the thirteenth century. In this department Dante also takes a high place with his *Vita Nuova*, and *Convito.* Francesco Petrarca (Petrarch; 1304-74), another of the great lights of Italian literature, exhibits in his sonnets and canzoni a vein less profound and transcendental than Dante's, but more humanly tender and passionate. Boccaccio (1313-75), a writer of great erudition and fertility, who produced classical translations, biographies, poems, etc., is Italy's first great story teller. He is the master of the ornate classical style in prose to which he first gave high artistic form. His great work

is the *Decamerone*, a collection of a hundred tales. Among the other productions of the time are the historical works of Villani Capponi and Dino Compagni, the latter of doubtful authenticity, the travels of the Venetian Marco Polo, and the letters of St. Catherine of Siena. Among the comic poets of the time are Bindo Bonichi, Cecco Nuccoli, Andrea Oagagni, and Antonio Pucci.

During the fifteenth century the intellectual energy of Italy was almost entirely absorbed in the study of the ancient classics. This period is known as the Renaissance, or the revival of arts and letters. Italy had at this time become wealthy by commerce, and was enjoying comparative peace. Her cities were full of learned Greek refugees from Constantinople; many of her states were ruled by families such as those of the Medici at Florence, the Este in Ferrara, the Gonzaga in Mantua, whose names are identified with the most munificent patronage of learning and art. In the midst of this classical enthusiasm there was some danger of the national literature and language being neglected, but towards the end of the century Italian literature revived with the *Canti Carnascialeschi* and *Ballate* of Lorenzo de Medici and Poliziano, the chivalrous epic *Orlando Innamorato* of Boiardo, the *Morgante Maggiore* of Luigi Pulci, and the *Mambriano* of Francesco Bello (Cieco of Ferrara).

During the first half of the sixteenth century the Renaissance movement perfected itself in every kind of art. In history the most noted names are Machiavelli (1469-1527), and Francesco Guicciardini (1482-1540). Among the great poets of the period are Lodovico Ariosto (1474-1533), author of *Orlando Furioso*, a romantic epic, written in continuation of the *Orlando Innamorato* of Boiardo, and Torquato Tasso (1544-95), whose *Gerusalemme Liberata* is Italy's chief heroic poem. Among the lyrists of this century we may mention Guidiccioni of Lucca, Pietro Bembo, Michelangelo Buonarroti, and Vittoria Colonna. Berni Cammelli and Grazzini deserve mention among humorous and burlesque writers, and Bandello among story tellers. Better known, however, are Giorgio Vasari (1512-74), himself an eminent painter, but more celebrated as a delightful gossip on art and artists; Benvenuto Cellini (1500-70), the famous artist in metal, whose autobiography is one of the most instructive lights on the spirit and manners of the age, and Giordano Bruno (1550-1600), a bold speculator and undaunted champion of liberty of thought. In the period which followed poetical and imaginative literature degenerated into mannerism and affectation. Of exceptional power was Alessandro Tassoni (1565-1635), who wrote the *Secchia Rapita*, a burlesque epic, and unquestionably the most important poetical production in Italian of the seventeenth century. Salvator Rosa, also, better known as a painter, wrote satirical verse of some merit. But the most eminent names of this period are those of scientific and philosophic writers. Among the former are Galileo Galilei (1564-1642), Torricelli (1608-1647), Viviani (1622-1703); among the latter are Tommaso Campanella (1568-1639), and Giambattista Vico (1668-1744). Among historians the names of Sarpi, Davila, Bentivoglio, and Pietro Giannone deserve mention. Towards the end of the century a new school of poetry arose, which was mainly a reaction against the existing turgid and affected style. The Academy of Arcadia was instituted (1690) to promote simplicity of style and the choice of simple pastoral subjects. The Arcadians produced no considerable poet, the chief names being Crescimbeni, Gravina, Frugoni, Zappi, and Rolli.

About the middle of the eighteenth century a complete revolution took place in Italian literature, which was preceded and accompanied by a general elevation of public life. The influence of English and German literature began to communicate a more healthy tone to the national literature. Gasparo Gozzi (1713-86) in the periodical *L'Osservatore*, and Giuseppe Baretti in a journal called the *Frustă Letteraria*, contributed perhaps more than any others, by their forcible and lively satire, to bring about this improvement. In dramatic literature the libretti of Pietro Trapassi (1698-1782), better known by his assumed name of Metastasio, had considerable merit, though tending to over-refinement of sentiment and expression. In 1713 Scipione Maffei, celebrated also as an archæologist, produced the tragedy of *Merope*, highly lauded at that time. But the two great names in the Italian drama are, in comedy, Carlo Goldoni (1512-74), and in tragedy, Vittorio Alfieri (1749-1803). Towards the end of the century the writings of the publicists, Gaetano Filangieri and Cesare Beccaria indicated the growth of a social science under the cover of treatises on legislation and penal laws.

From the intellectual and political ferment which arose about the beginning of the nineteenth century Italy in particular received a much-needed stimulus. In poetry Ugo Foscili (1776-1827), though following classical models and

traditions, writes with the force and novelty of a new epoch. Vincenzo Monti (1754-1828) had a rich poetic vein and a facile talent. Alessandro Manzoni (1784-1883) has given Italy a few lyrics of the first rank, but the work which has most contributed to give him the high place he holds in literature is his novel, *I Promessi Sposi.* An equally high, if not a higher place, is due to the poetry of Leopardi. His prose is among the best that Italy has produced. Among the lesser though still notable names are Tommaso Grossi, Silvio Pellico, Giambattista Niccolini, a writer of dramas; Giovanni Barchet, a writer of songs and lyrics; and Giuseppe Giuste, the genial satirist. The historico-political writings of Vincenzo Gioberti (1801-52) and Giuseppe Mazzini (1805-72) contributed powerfully to stimulate the national feeling and to shape the course of events. In history proper Amari (*I Vespri Siciliani*), Gino Capponi (*Republica di Firenze*), Ricotti, Zamboni, and others are the best known names. Among later and contemporary authors we may mention the poet, critic and essayist Giosue Carducci; Francesco de Sanctis (1818-86), the Sainte-Beuve and Matthew Arnold of Italy; Ruggero Bonghi, a biographer and essayist of superior rank: Guglielmo Ferrero, historian and lecturer: Edmondo de Amicis, a descriptive writer of considerable power; Angelo de Gubernatis, a writer of literary biographies; Nicidini, a very popular dramatist: Mauzon, whose *Promessi Sposi* is the only great historical novel of Italy; Silvio Pellico, who has told the story of his own imprisonment; the historians Balbo and Cantù; and Gabriele D'Annunzio, the poet, dramatist and novelist, who represents the literary aspirations of young Italy.

Itasca Lake. See *Mississippi River.*

Itch (ich), a contagious cutaneous disease, appearing in small watery pustules in the skin, accompanied with uneasiness and irritation that inclines the patient to rub and scratch. It is occasioned by a small insect (*Acărus scabiei*), which burrows within the epidermis; and is cured by sulphur, which should be applied externally in the form of ointment. See next article.

Itch-mite (ich-mīt; *Acărus scabici* or *Sarcoptes scabiei*), a microscopic insect belonging to the class Arachnida, which produces an itch in man. The female burrows in the skin, in which she deposits her eggs, which are hatched in about ten days, which gives rise to this troublesome and irritable affection.

Ithaca (ith'a-ka), now THIAKI, one of the Ionian Islands, on the west of Greece, between the mainland and Cephalonia, 17 miles long, and not above 4 broad. It is rugged and uneven, and divided into nearly equal parts, connected by a narrow isthmus. The inhabitants are industrious agriculturists and mariners, and build and fit out a considerable number of vessels. They seem to be of pure Greek race, and the women are famed for their beauty. Ithaca was the royal seat of Ulysses, and is minutely described in the Odyssey. Schliemann has recently made important excavations, and has identified several sites mentioned by Homer. Vathi, the modern capital, trades largely in oil, wine, raisins, and currants, and has a pop. of about 6000; that of the island is about 13 000.

Ithaca, a city of New York, the capital of Tompkins County, about 1½ miles S. of the head of Cayuga Lake, is the seat of Cornell University (which see). It has numerous manufactures and important coaling interests, and has in its vicinity much picturesque scenery, abounding in waterfalls and cascades. Pop. 14,802.

Itinerary (ī-tin'er-a-ri), a list of the stations or places on the route between two important localities, together with the distances between them.

Ito, PRINCE HIROBUMI, an eminent Japanese statesman, born in Aposhu province in 1840. After visiting Western countries he became an active reformer, and was made premier in 1886. He was the father of the present Constitution of Japan, was premier again in 1892-95, and a third time in 1900. During the war of 1894 he commanded the fleet, gained a victory on September 7, and in January, 1895, compelled the surrender of the Chinese fleet. After the close of the war he was given the task of converting Corea, which had become the prize of the victors, into a Japanese province, and as part of this duty he compelled the Corean king to sign away his sovereign rights. He won the hatred of the Coreans by this action, but was not arbitrary or unduly harsh in his government. In 1907 he was raised to the dignity of Prince and recalled to succeed Marshal Yamagata as president of the privy council. In 1909 he proceeded to Harbin to hold a conference with the Russian minister of finance concerning the Manchurian railways, and while there was assassinated by a Corean, on October 26.

Itri (ē'trē), a town of South Italy, in the province of Casserta, 6 miles N. W. of Gaeta, on a lofty hill. Pop. 5677.

Itu (ē′tö), Hitu′, or Ytu′, a town of Brazil, province of Sao Paulo, on the Tiete. Pop. 10,000.

Ituræa, Iture′ (ē-tu-rē′a), a district on the north of ancient Palestine, stretching northeastward from Mount Hermon.

Iturbide (ē-tur′bē-*dā*), Augustin de, a distinguished Spanish-American, born at Valladolid, in Mexico, in 1787. On the breaking out of the revolutionary troubles in Mexico he joined the royalist party, and displayed such valor and ability that in 1815 he rose to the chief command of the army, but latterly went over to the other side, quickly bore down all opposition, and became so popular that he proclaimed himself Emperor of Mexico in 1822. His reign was full of trouble, and came to an end in less than a year, by his abdication. Congress granted him a yearly pension on condition of his leaving the country, and he resided in Leghorn about a year, when he made an attempt to recover the crown. He landed with but a single attendant, and was arrested and shot, 1824.

Itzehoe (it′se-hō), a town of Prussia, in Schleswig-Holstein, in a valley enclosed by wooded hills, on the Stör, 32 miles northeast of Hamburg. It is the oldest town in the duchy, being founded by Charlemagne in 809. Pop. 15,649.

Iulus (i-ū′lus), a genus of *Myriapoda*, order Chilognatha, including worm-like animals known as millipedes, allied to the centipedes.

Ivan (ē′van), or Iwan, the name of several rulers distinguished in Russian history.—Ivan III (or I), grand-prince of Moscow, was born in 1440; ascended the throne in 1462; died in 1505. He greatly enlarged his hereditary possessions, and married Sophia, niece of the last Byzantine emperor, thus introducing the double-headed Byzántine eagle into the Russian coat of arms. He was the first that bore the title of Czar of Great Russia, and proclaimed the unity and the indivisibility of the Russian dominions.—Ivan IV (or II), grandson of the former, was born in 1530; succeeded in 1534, was crowned in 1547; died in 1584. His atrocities gained him the name of *The Terrible.* Yet he did much to civilize and improve his people, introduced learned men, artists and mechanics into Russia, and concluded a commercial treaty with England. He killed his eldest son in a fit of rage.

Ivanovo (ē-vö′nō-vō), a town of Russia, government of Vladimir, an important center of the Russian cotton manufacture, and hence styled 'the Russian Manchester.' Pop. 64,628.

Ives (īvz), St., a seaport town of England, in Cornwall, picturesquely situated on St. Ives Bay, 18 miles W. N. W. from Falmouth. The principal business of the place is the pilchard fishery. The town gives name to a parliamentary division of the county. Pop. 7179.

Ives, St., a market town of England, in Huntingdonshire, on the Ouse. The markets for cattle and sheep are among the largest in the kingdom. Pop. (1911) 3015.

Iviça (ē′vith-à; ancient *Ebŭsus*), an island of the Mediterranean belonging to Spain, 52 miles from Majorca, one of the Balearic Islands; area, 190 square miles; pop. 25,505. It is fertile, producing corn, wine, oil, fruit, etc. Salt forms, with fish and wood, the chief export. The capital is of the same name, and has a good harbor. Pop. 23,524.

Ivory (ī′vu-ri), the osseous matter of the tusks of the elephant, and of the teeth or tusks of the hippopotamus, walrus, and narwhal. Ivory is esteemed for its beautiful white or cream color, its hardness, the fineness of its grain, and its susceptibility of a high polish. That of the African elephant is most esteemed by the manufacturer for its density and whiteness. It is used as a material for knife-handles, pianoforte keys, etc. The ivory of the hippopotamus is preferred by the dentist, being free from grain and much harder and of a purer white than that of the elephant. The shavings and sawdust of ivory may by burning be converted into a black powder, used in painting, named *ivory black.* Ivory may be stained or dyed; a black color is given it by a solution of brass and a decoction of logwood; a green one by a solution of verdigris; and a red by being boiled with Brazil wood in lime-water. The use of ivory, chiefly for ornamental purposes, was well known in early ages. Among the Greeks it was employed for statuary purposes, etc. The medium weight of an elephant's tusk is 60 lbs., but some are found weighing 170. Ivory is an important article of African trade, and the number of elephants annually killed must be great; indeed, the extermination of this noble animal is only a question of time.

Ivory, Vegetable. See *Ivory-palm.*

Ivory-black, a fine kind of soft black pigment, prepared from ivory dust by calcination, in the same way as bone-black. See *Bone-black.*

Ivory Coast, part of the coast of Guinea, between Cape Apollonia and Cape Palmas. The eastern portion of it belongs to Britain.

Ivory-nuts. See *Ivory-palm.*

Ivory-palm (*Phytelĕphas macrocarpa*), a low-growing, palm-like plant, order Pandaneceæ, native of the warmer parts of South America. It has a creeping caudex or trunk, terminal pinnatifid leaves of immense size, male and female flowers on different plants, and fruit in the form of a cluster of drupes, weighing about 25 lbs. when ripe. Each drupe contains 6 to 9 seeds, as large as a hen's egg, the albumen of which when ripe is close-grained and very hard, resembling the finest ivory in texture and color. It is therefore often wrought into buttons, knobs for doors or drawers, umbrella handles and other articles, and is called *Vegetable Ivory.* The seeds are also known as *Corozo-nuts*, and are imported in considerable quantities.

Ivrea (iv-rā'à), a town of North Italy, province of Turin, picturesquely situated on the Dora Baltea, with a cathedral, said to have been founded in the fifth century on the site of a heathen temple. Pop. 11,696.

Ivry-la-Bataille (iv-rē-là-bà-tā yė), a village in France, 40 miles W. of Paris, where a battle was gained by Henry IV in 1590 over the forces of the League.

Ivry-sur-Seine (iv-rē-sûr-sen), a town of France, on the Seine, 3 miles S. S. E. from Paris. It has a fine church, the remains of an old castle, asylum for lunatics, various manufactures, and extensive wine cellars hewn out of the rock. Pop. 30,532.

Ivy (ī'vi), a climbing plant of the genus *Hedera* (*H. Helix*), nat. order Araliaceæ. The leaves are smooth and shining, varying much in form, from oval entire to three and five lobed; and their perpetual verdure gives the plant a beautiful appearance. The flowers are greenish and inconspicuous, disposed in globose umbels, and are succeeded by deep green or almost blackish berries. *H. Helix* (the common ivy) is found throughout parts of Asia and Africa. It is plentiful almost the whole of Europe, and in many in Britain, growing in hedges, woods, on old buildings, rocks and trunks of trees. A variety, called the Irish ivy, is much cultivated on account of the large size of its foliage and rapid growth. Several varieties of ivy are grown in American gardens. The ivy attains a great age, and becomes several inches thick. The wood is soft and porous, and when cut into very thin plates may be used for filtering liquids. In Switzerland and the south of Europe it is employed in making various useful articles. The ivy has been celebrated from remote antiquity, and was held sacred in some countries, as Greece and Egypt. Its medicinal properties are unimportant. Chinese ivy (*Parechites Thunbergii*) is a climbing shrub with privet-like leaves and sweet-scented flowers.

Ixia (iks'i-a), a genus of plants of the Iris family, natives of the Cape of Good Hope, and prized for their large and showy flowers.

Ixion (iks'i-on), in Greek mythology, king of the Lapithæ in Thessaly, who for his wickedness was punished in the infernal regions by being tied to a perpetually revolving fiery wheel.

Ixmiquilpan (ēs-mē-kwēl'pan), a town of Mexico, State of Hidalgo, 80 miles north of the city of Mexico, with silver mines in its neighborhood. Pop. about 12,000.

Ixodes (iks-ō'dēs), the *'Ticks'* (which see).

Ixtle (iks'tl), a Mexican fiber, probably the production of a species of the pineapple family.

Izdubar (iz'dū-bàr), a hero of early Babylonia, possibly a real personage, but converted into a deity and worshiped. In the cuneiform inscriptions feats similar to those of Hercules are ascribed to him.

Izucar (ē-sö-kär'), a town of Mexico, 90 miles southeast of the capital, at the base of Popocatepetl, the center of a rich sugar region. Pop. about 9000.

J

J, the tenth letter in the English alphabet, and the seventh consonant. The sound of this letter coincides exactly with that of *g* in *genius*. It is therefore classed as a palatal, and is the voiced sound corresponding to the breathed sound *ch* (as in *church*). The sound does not occur in Anglo-Saxon, and is introduced through the French. As a character it was formerly used interchangeably with *i*, and the separation of these two letters in English dictionaries is of comparatively recent date.

Jaal-Goat (jā'al-gōt; *Capra Jaala*), a species of goat found in Egypt, Abyssinia and Mount Sinai.

Jabalpur (*ja'*-b*a*l-pör), JUBBULPORE, a town of Hindustan, capital of Jabalpur district, Central Provinces, a modern town with wide and regular streets, an important railway station and center of trade, situated amid rocks at an elevation of about 1500 feet above the level of the sea. It has a school of industry, in which large quantities of tents and carpets are made. Pop. 89,700. The district has an area of 3918 sq. miles, a pop. of 687,233. A division or commissionership of the Central Provinces has also the same name. It has an area of 18,688 sq. miles; a pop. of 2,201,633.

Jabiru (jab'i-rū), a name of wading birds of the crane kind, resembling the stork, and inhabiting South America, Africa and Australia.

Jaborandi (ja-bo-ran'di), a powerful drug obtained from the leaves and root of one or more plants of the genus *Pilocarpus*, order Rutaceæ, natives of Brazil. It causes a great increase of the saliva and profuse perspiration.

Jacamar (jak-a-mär'; *Galbŭla*), a genus of brilliant birds nearly allied to the kingfishers, differing however by the form of their beak and feet. They live in damp woods, and feed on insects. Most, if not all, are natives of tropical America.

Jacana (jak'a-na), the common name of grallatorial or wading birds of the genus *Parra*, having long toes with very long nails, so that they can stand and walk on the leaves of aquatic plants when in search of their food, which consists of worms, small fishes, and insects. They inhabit marshes in hot climates, and somewhat resemble the moorhen, to which they are very closely allied.

Long-tailed Jacana (*Parra sinensis*).

Jacaranda (jak-a-ran'da), a name of several South American trees, nat. order Leguminosæ, yielding the fancy woods known as violet-wood, king-wood, and tiger-wood. A genus of Brazilian tree is also called *Jacaranda*, and some species of it yield rosewood. It belongs to the nat. order Bignoniaceæ.

Jacare (jȧk'ȧ-rā), a species of Brazilian alligator, *Jacare* or *Alligator sclerops*.

Jacitara-palm (ja-si-ta'ra-pâm; *Desmoncus macroacanthus*), a palm found in the forests of the lowlands of the Amazon district in South America. It has a slender flexible stem, often 60 or 70 feet long.

Jack (jak), from Fr. *Jacques*, James, which being a very common personal name in France, came to stand for any common fellow or menial, and was substituted for the equally common English name John. Hence its application in such terms as *boot-jack*, *smoke-jack*, *roasting-jack*, etc., and also in several senses alone, as to the knaves in a pack of cards, the small bowl aimed at in a game of bowls, and a small pike as opposed to the full-grown fish. There are also such uses as *Jack-of-all-trades*, *Jack-knife*, *Jack-fool*, *Jack-ass*, *Jack-pudding*, etc.; also a *jack* is an apparatus for raising great weights by the application of strong screws. The flag called a *jack*

is strictly one displayed from a staff on the end of a bowsprit. See *Union Flag.*

Jack, or JACA (*Artocarpus integrifolia*), a tree of the bread-fruit genus, a native of India. The fruit grows to a larger size than the bread-fruit, often weighing more than 30 lbs.; but it is not so palatable.

Jackal (jak'ạl), an animal of the dog genus (*Canis aureus*), resembling a dog and a fox, a native of Asia and Africa. The general color is a dirty yellow. The jackal is gregarious, hunting

Jackal (*Canis aureus*).

in packs, rarely attacking the larger quadrupeds. They feed chiefly on carrion, and are nocturnal in habits. The jackal interbreeds with the common dog, and may be domesticated. The common jackal is the most widely distributed. Another species is found in Southern Africa, the black-backed jackal (*C. mesomĕlas*).

Jack-a-Lantern. See *Ignis Fatuus.*

Jackass, LAUGHING. See *Laughing Jackass.*

Jack-boots, large boots reaching above the knee, used by horsemen (military and other) as a sort of protection for the legs.

Jackdaw (jak'dạ; *Corvus monedŭla*), a common European bird of the crow family, smaller than the rook, having a comparatively short bill and whitish eyes; hinder part of the head and neck of a grayish color, back and wings glossy black. The average length is about 12 inches. The nests are built in towers, spires, and like elevated situations, and often in towns. The eggs, from five to six, are of a greenish color. Its food consists of worms, insects and larvæ. Like the rooks, they are gregarious. They are readily domesticated, and may be taught to pronounce words distinctly.

Jack-in-the-Pulpit, the popular name given to a species of *Arum*, common in wet woodlands in the United States. The name comes from its erect scape, standing within the long sheath of its petioles. The fruit is a bunch of bright scarlet berries.

Jack-Rabbit, or jackass rabbit, a large rabbit (*Lepus callotis*) of the Western United States. It has very long ears and its gait is a series of long leaps.

Jackson, a city, capital of Jackson county, Michigan, 76 miles west of Detroit. It is an important railway center, with coal-mines in its vicinity. Its industries include railroad shops, large flour and planing mills, and wagon works, agricultural implement works, and a variety of other manufactures. Here is Michigan State prison. Pop. 31,433.

Jackson, a city, capital of the State of Mississippi, on the Pearl River, 44 miles east of Vicksburg. It contains a handsome State house and other government buildings, the State lunatic asylum, penitentiary, etc. Agricultural implements, machinery, cotton-seed oil, etc., are made, and there is a large trade in cotton. Pop. 21,262.

Jackson, a village, capital of Jackson county, Ohio, 44 miles N. E. of Portsmouth, on the Detroit Southern and other railroads, and with iron-furnaces, woolen, flour and planing mills, etc. Coal and iron ore are largely mined. Pop. 5468.

Jackson, a city, capital of Madison county, Tennessee, on the Forked Deer River and several railroads, 90 miles E. N. E. of Memphis. It has varied industries, and ships thousands of bales of cotton annually; also has large grain shipments. Here is the Southern Baptist University and other institutions of learning. Pop. 15,779.

Jackson, ANDREW, soldier and President, was born in the border region of North and South Carolina, in 1767, of Irish ancestry. In his 14th year, during the war of the Revolution, he joined a regiment of volunteers to fight in the cause of independence. After losing two brothers in the struggle and himself receiving a severe wound, he left the military service and engaged in the study of law, removing in 1788 to Nashville, Tennessee, when he began practice. He took part in framing the Constitution of Tennessee, was elected to the United States Senate in 1797, and resigned and became a judge in the Supreme Court of Tennessee in 1798. When, in 1812, war was declared against England, he was made major-general of the Tennesssee militia and in 1813 marched against the Creek Indians, then

in serious revolt, and completely defeated them. He was subsequently ordered to the defense of New Orleans against the British invasion of 1814, and in 1815 repulsed the invading forces with great loss. In 1817-18 he fought against the Seminole Indians of Florida, worsted them, and in 1821 was made governor of Florida, which Spain had sold to the United States. He was elected United States Senator again in 1823, and ran for President in 1824. Though he had the largest vote, he failed to obtain a majority over the other candidates, and lost the election by the vote of the House of Representatives. He was elected in 1828 and again in 1832, and in 1836 had Martin Van Buren elected by his influence. An honest and upright man, he was dictatorial and obstinate, and his career was sullied by several acts of undue severity. In 1837 he retired to his estate in Tennessee and died there on June 8, 1845.

Jackson, CHARLES THOMAS, scientist, was born at Plymouth, Massachusetts in 1805, and was graduated at Harvard Medical College in 1823. He was appointed State geologist of Maine in 1836 and of New Hampshire in 1840, and published reports on their geology; also *Mineralogy and Geology of Nova Scotia.* He claimed to have been the first to point out, in 1832, the applicability of electricity to telegraphy, and also to have been the original discoverer of anæsthetics. He received for this the Montegau prize of 2500 francs from the French Academy of Sciences in 1852. He died in 1880.

Jackson, HELEN HUNT, authoress, was born at Amherst, Massachusetts, in 1831; died in 1885. She married a Mr. Hunt, who died in 1863, and afterwards a Mr. Jackson. Removing to Colorado Springs, Colorado, she became warmly interested in the treatment of the Indians by the government, and strove earnestly to better their condition. She was appointed in 1883 to investigate the condition of the Nassau Indians of California, and studied the history of the early Spanish missions. She wrote on the Indian subject *A Century of Dishonor*, also *Verses by H. H.*, *Bits of Talk*, etc.

Jackson, THOMAS JONATHAN, better known as *Stonewall Jackson*, a general in the Confederate army, born in 1824 in Virginia. In 1842 he entered the military academy at West Point as cadet. Four years later he received a second-lieutenant's commission, and was engaged in the Mexican war, and for his gallantry was made a captain, and afterwards raised to the rank of major. In 1851 he resigned his commission and was appointed professor of mathematics and artillery tactics in the military institute at Lexington, Virginia. On the outbreak of the Civil war, in 1861, he entered the Southern army with the rank of brigadier-general. He commanded the reserve at Bull Run, and acquired his cognomen of 'Stonewall' by the firmness of his troops and his own coolness in the heat of the action. By the end of the year he was made major-general. In June, 1862, he repelled Fremont at Cross Keys, and routed McDowell near Port Republic. He took a leading part in the second battle of Bull Run, captured Harper's Ferry in September, during Lee's March to Antietam, and was prominent in the subsequent battle of Antietam. He also took part in the battle of Fredericksburg and the victory at Chancellorsville was largely due to him. He was wounded inadvertently by his own men in this battle, and died May 9, 1863. He was a man of indomitable energy and deep religious feeling, and was regarded as a soldier of remarkable ability, greatly aiding General Lee by his daring and brilliant movements.

Jackson, WILLIAM, an English musical composer, born in 1730; died in 1803. Having studied music in London, in 1777 he was made organist of the cathedral in his native city, Exeter, where he passed the rest of his life. His musical compositions, especially his songs and duets, are still justly popular, and are distinguished by chasteness of conception, ingenuity and truth of expression.

Jacksonville, a city of Florida, capital of Duval county, on the St. John's River, about 14 miles from its mouth. The river is navigable for steamboats 200 miles farther up. Jacksonville is the largest city and the center of commerce for Florida, while its mild winter climate has made it a popular place of resort. It has a large trade in cotton, lumber, etc., and has shipyards, engineering works, iron-foundries, and various other industries. There is here a Confederate Soldiers' Home and a National Marine Asylum. Pop. 57,699.

Jacksonville, a city of Illinois, on a fertile prairie, near a small affluent of the Illinois River. It has been called the '*Athens of the West*,' and is distinguished for the elegance of its public buildings, and for the number of its educational and charitable institutions, among which are the Illinois College, the State asylums for the blind, the insane and the deaf and dumb. It has

large woolen mills, carriage factories, planing mills, etc. Pop. 15,326.

Jacob (jā'kub), the son of Isaac, and the grandson of Abraham, the last of the Jewish patriarchs, and the true ancestor of the Jews. Having craftily obtained from the blind and infirm Isaac the blessing of the first-born in place of his brother Esau, he was obliged to flee from the anger of his brother, and took up his abode with his uncle Laban. Here he served twenty years, and obtained Leah and Rachel as his wives. On his return to Canaan he was met by an angel, with whom he wrestled all night, and having gained the victory was thereafter named *Israel*, that is, *the hero of God*. Hence the Hebrews from him are called *Israelites*. A severe blow to him in his old age was the loss of his favorite son Joseph, whose brothers had sold him to Ishmaelite merchants, and led Jacob to believe that he had been devoured by wild beasts. Joseph subsequently became the highest officer at the court of Pharaoh in Egypt, and thus was the means of bringing the whole house of his father to that country. Jacob died, aged 147 years, approximately about 1860 B.C., and according to his wish was buried in the tomb of Abraham, before Mamre in Canaan.

Jacobabad (ja-kob-ä-bäd'), a town of Hindustan, the military and civil headquarters of the Upper Sind frontier district, Bombay. Pop. 11,552.

Jacobean Architecture, a term applied to the later style of Elizabethan architecture from its prevailing in the time of James I (L. *Jacōbus*, James). It differed from the pure Elizabethan chiefly in having a greater admixture of debased Italian forms.

Jacobi (yå-kō'bi), FRIEDRICH HEINRICH, a German philosopher, born in 1743; died in 1819. He first engaged in commerce, but quit business on receiving a public appointment. He formed acquaintance with many of the most eminent literary men of the day, including Goethe, Wieland and Herder. Subsequently he was made president of the Bavarian Academy at Munich, retiring in 1813. His views had some analogies with those of Hamilton and the Scotch school. Thought, he affirms, cannot explain facts but only connect them. The existence of objects that affect us cannot be demonstrated, but we are directly convinced of their existence in the act of perception. The knowledge of God is present to us through the heart in virtue of the divine spirit within us, which comes directly from God. His most noted works are the philosophic novels, *Allwill's Briefsammlung* and *Woldemar;* a work on the doctrine of Spinoza, in Letters to Moses Mendelssohn; *David Hume über den Glauben*, or *Idealism and Realism.*

Jacobins (jāk'u-binz), the most famous of the clubs of the first French revolution. When the states-general assembled at Versailles in 1789, it was formed and called the *Club Bréton.*

Jacobean Architecture.—Waterston Hall, Dorset.

On the removal of the court and national assembly to Paris it acquired importance and rapidly increased. It adopted the name of *Soeiété des Amis de la Constitution*, but as it met in a hall of the former Jacobin convent in Paris, it was called the Jacobin Club. It gradually became the controlling power of the revolution, and spread its influence over France, 1200 branch societies being established before 1791, and obeying orders from the headquarters in Paris. In 1791 the publication of the *Journal de la Soeiété des Amis de la Constitution* increased the zeal and number of the societies. The Jacobins were foremost in the insurrectionary movements of June 20 and August 10, 1792; they originated the formidable *eommune de Paris*, and changed their former name to *Les Amis de la Liberté et de l'Egalité.* For a while they ruled supreme, and the Convention itself was but their tool. Robespierre was their most influential member; they ruled through him during the Reign of Terror, and were overthrown after his

downfall in 1794. In that year the Convention forbade the affiliation of societies; the Jacobin Club was suspended and its hall was closed. The term Jacobin is now used in Britain to designate anyone holding extreme views in politics.

Jacobites (jak'u-bīts), a party in Britain (so styled from Lat. *Jacōbus*, James), who after the revolution in 1688 continued to be the adherents of the dethroned King James II and his posterity. In Ireland they were soon put down by conquest. In England the revolution was accomplished with the apparent consent of all parties; but in a year or two the Jacobite party gained considerable influence, and continued to disturb the government of William throughout his reign. After the accession of Anne and the death of James their efforts slackened for a time; but towards the close of her reign they revived. Bolinbroke and Oxford, with others of the Tory ministers of Anne, were in treaty with the son of James II, and either really or pretendedly negotiated for a restoration. On the arrival of George I in 1715 a rebellion broke out in Scotland, supported by a more insignificant rising in the north of England. The failure of both these movements damped the enthusiasm of the English Jacobites, but in Scotland the party maintained its influence until the unsuccessful rebellion of 1745 put an end to its political importance, though some ultra-Jacobites did not think themselves justified in transferring their allegiance to the house of Brunswick till the death of Cardinal York, in 1807. The hopes and wishes of the Scottish Jacobites found expression in many beautiful songs, which form an interesting portion of the national literature.

Jacobites, Monophysite Christians in the East, who were united by a Syrian monk, Jacobus Bardai (578), during the reign of Justinian, into a distinct religious sect. The Jacobites, so styled from their founder, consist of about 30,000 or 40,000 families, and are governed by two patriarchs, appointed by the Turkish governors, one of whom, with the title of the *Patriarch of Antioch*, has his seat at Diarbekir; the other resides in a monastery near Mardin, under the style of *Patriarch of Jerusalem*. Circumcision before baptism and the doctrine of the single nature of Christ (hence their name *Monophysites*) are common to them with the Copts and Abyssinians; but in other respects they deviate less than the other Monophysites from the discipline and liturgy of the orthodox Greek Church.

Jacob's Ladder (*Polemonium cœrulerum*), a herbaceous perennial plant, common in the center and south of Europe and found in the temperate parts of Asia and North America. It has a smooth stem about 2 feet high, and a terminal panicle of bright blue (sometimes white) flowers. Great medicinal virtues were once ascribed to it, but all now found in it is a slight astringency.

Jacquard (zhȧk-är), Joseph Marie, the inventor of the famous machine for figured weaving named after him, was born at Lyons in 1752. His parents were silk weavers, and he learned the same trade. After a long period of hardship, during which he shared in some of the campaigns of the revolution, he made his name famous by the invention of his new loom, which was publicly exhibited in 1801. He endeavored to introduce it into general use in Lyons, but was mobbed, and all but lost his life. Ultimately, however, his invention was bought by the French government, and he was able to spend the latter part of his life in comfortable independence. The subsequent prosperity of Lyons is largely attributable to his invention, and a more enlightened generation erected a statue to him on the very spot where his loom had been destroyed by the mob. He died in 1834.

Jacquard Loom, a form of loom, the characteristic of which is a contrivance appended to it for weaving figured goods in various colors. See *Weaving*.

Jacquerie (zhäk-rē), the name given to the rising of the French peasantry against their lords in the middle of the fourteenth century after the battle of Poitiers. They committed great devastations and outrages, particularly in the northeast of France. They were at length quelled by Captal de Buch and Gaston Phébus, count of Fois. The term *Jacquerie* is derived from *Jacques Bonhomme*, a familiar epithet for a peasant.

Jactitation of Marriage, in the common law, a boasting or giving out by a party that he or she is married to another, whereby a common reputation of their marriage may follow.

Jade, or Jaihde (yä'de), a small strip of coast territory belonging to the Prussian province of Hanover, but locally in the grand-duchy of Oldenburg, at the entrance of Jade Bay. It was acquired by the Prussian government for the purpose of constructing a naval port and shipyard, and here has grown up Wilhelmshaven (which see).

Jade (jād), an ornamental stone, also called nephrite, a native silicate of calcium and magnesium, usually of a color more or less green, of a resinous or oily aspect when polished, hard and very tenacious. It has been used by rude nations for their weapons and implements, and has been and is highly prized for making carved ornaments in China, New Zealand, and among the native races of Mexico and Peru. Jade celts or axes are common among uncivilized races, and prehistoric specimens have been found in Europe, though the stone itself is not found there. A similar stone, more properly called *jadeite*, is frequently confounded with jade proper. It is a silicate of aluminum and sodium.

Jaen (*h*å-ān′), a picturesque town of Andalusia, Spain, capital of the province of Jaen, on the Jaen, a tributary of the Guadalquivir, 122 miles E. N. E. of Seville. It is the seat of a bishop, and has two cathedrals. Pop. 26,434.

Jaffa (jaf′fa; anciently *Joppa*), a maritime town in Palestine, 31 miles northwest of Jerusalem, picturesquely situated upon an eminence, the port of Nablus and Jerusalem, with which latter it is connected by railway. It exports oranges (an excellent variety), soap, grain, sesame, olive oil, etc. Pop. above 20,000.

Jaffna (jäf′na), or JAFNAPATAM, a town in Ceylon, at the northern extremity of the island, originally a Dutch settlement, and still thoroughly Dutch in its architecture and aspect. Most of the inhabitants are Tamils and Moors. Pop. 33,879.

Jagannâtha (*jag*-*an*-nät′ h*a*; Skr. 'Lord of the World'), often written *Juggernaut*, the name given to the Indian god Krishna, the eighth incarnation of Vishnu, and to a very celebrated idol of this deity in a temple specially dedicated to Jagannâtha at Puri, a town in Orissa, on the Bay of Bengal. It is a very rudely-cut wooden image, having the body red, the face black, and the arms gilt; the mouth is open and blood-red; the eyes are formed of precious stones. It is covered with magnificent vestments and seated upon a throne between two others—his brother Bala-Rama and his sister Subhadra, colored respectively white and black. Great numbers of pilgrims, sometimes a hundred thousand, at the time of the festivals of Jagannâtha, assemble from all quarters of India to pay their devotions at his shrine. On these occasions the idol is mounted on a huge car resting on sixteen wheels, which is drawn by the pilgrims; and it has been stated and credited that formerly great numbers of the congregated people were wont to throw themselves under the wheels, and were thus crushed to death, the victims believing that by suffering this sort of death they would be immediately conveyed to heaven. This statement, however, is no longer accepted, it being now claimed that 'the rare deaths at the car festival were almost always accidental.'

Jägerndorf (yā′gėrn-dorf), a town of Austria, in Silesia, on the Oppa, 13 miles northwest of Troppau. It is walled, has a handsome church, a ducal palace, and manufactures of woolens, etc. Pop. 14,675.

Jaggery (jag′ėri), a coarse brown sugar made in the East Indies by the evaporation of the juice of several species of palms. It is chemically the same as cane-sugar.

Jaghire (jag′hēr), in Hindustan, a term closely corresponding to the fief of mediæval Europe. It is an assignment of the government share of the produce of a portion of land to an individual, either personal or for the support of a public e ablishment.

Jago, St., several cities, islands, etc. See *Santiago*.

Jaguar (ja-gwär), *Felis onca*, the American tiger, a carnivorous animal of South and Central America, sometimes equalling a tiger in size, of a

Jaguar (*Felis onca*).

yellowish or fawn color, marked with large dark spots and rings, the latter with a dark spot in the center of each. It rarely attacks man unless hard pressed by hunger or driven to bay. The skin is valuable, and the animal is hunted by the South Americans in various ways.

Jahde. See *Jade* (Prussian territory).

Jahn (yän), OTTO, a German philologist and archæologist; born in 1813; died in 1869. He studied at Kiel, Leipzig and Berlin, traveled in France and Italy, on his return qualified himself for university teaching, became professor extraordinary of archæology and philology at

Greifswald in 1842, and full professor in 1845. In 1847 he was called to a similar chair in Leipzig, but lost this post in 1851 for his political action. In 1855 he was called to Bonn as professor of antiquities and director of the art museum. His writings on classical art and antiquities were very numerous; he also edited works of Greek and Latin authors, and published valuable contributions to the history of German literature, as also on various musical subjects.

Jail, or GAOL (jāl), a prison or place of legal confinement. See *Prison.*

Jail Fever, a dangerous disease once very prevalent in prisons, and which is now considered to be merely a severe form of typhus fever (which see).

Jainas (jī'nas), or JAINS, a Hindu religious sect, which, from the wealth and influence of its members, forms an important division of the Indian population. The sect was very numerous and important in the eighth and ninth centuries of the Christian era, and they have left many monuments of their skill and power in the fine temples built in different parts of the country. Jainism was an offshoot of Buddhism, with which it has many leading doctrines in common, but is distinguished from it by its recognition of a divine personal ruler of all, and by its political leanings towards Brahmanism. The Jains reverence certain holy mortals, who have acquired by self-denial and mortification a station superior to that of the gods; and they manifest extreme tenderness for animal life.

Jaintia Hills (jīn'ti-a), a collection of hills in Assam, giving name to a district of about 2000 square miles, with 56,000 inhabitants.

Jaipur (jī-pör'), or JEYPORE, a state in Rajputāna, Hindustan, governed by a maharajah, under the political superintendence of the Eastern States Agency; area, 15,579 sq. miles. The soil, except in the southeast, is mostly sandy; the surface of the country is diversified by hill ranges. Corn, cotton, tobacco, opium and sugar-cane are extensively raised. There are manufactures of enamel work on gold, of woolen cloth, etc. Pop. 2,658,666.—The capital, JAIPUR, one of the finest of modern Hindu cities, has regular streets, with large, handsome houses. There is a college, a school of arts, an industrial museum, a hospital, fine gardens and several beautiful temples. Pop. 160,167.

Jaisalmer (jī-sal-mār'), or JEYSULMEER, a state of India in Rajputāna, under the political superintendence of the Central India Agency; area, 16,447 square miles. It is mostly a sandy desert with sparsely scattered villages. Water is scarce, the wells going down to a depth of 490 feet in some cases. The climate is dry and healthy. Pop. 73,370.—JAISALMER, the capital, is situated on a rocky ridge. The palace, the Jain temples in the fort, and the houses of the wealthy are remarkable for exquisite stone-carving. Pop. 7137.

Jājpur, JAJPORE (jaj'pör), a town of Hindustan, on the Baitarani, in Cuttack district, Bengal. It is held in considerable sanctity among the Brahmans, who celebrate an annual fair in honor of the 'Goddess of the Waters' of Hindu mythology. Pop. 12,111.

Jalalabad (ja-lä-lä-bad'). See *Jelalabad.*

Jalalpur (ja-läl'pör), a town of Hindustan, in Gujrat district, Punjab, with a government school and a shawl manufacture. Pop. 12,839.

Jalandhar (jal-an-dhar'), or JULLUNDUR, a town of Hindustan, headquarters of district of same name, in the Punjab; with a good trade, military cantonment, excellent American Presbyterian mission school, etc. Pop. 67,735.—The district, a fertile tract between the Sutlej and the Beas, has an area of 1,332 sq. miles, a pop. of 917,587. A division or commissionership has also this name; area 19,400 sq. miles; pop. 4,306,662.

Jalap (jal'ap; so called from *Jalapa,* in Mexico, whence it is imported), the name given to the tuberous roots of several plants of the nat. order Convolvulaceæ, that of *Ipomœa purga* being the most important. This is a

Jalap Plant (*Ipomœa purga*).

twining herbaceous plant, with cordate-acuminate, sharply auricled leaves, and elegant salver-shaped deep pink flowers, growing naturally on the eastern declivities of the Mexican Andes, at an elevation of from 5000 to 8000 feet. The jalap of commerce consists of irregu-

lar ovoid dark-brown roots, varying from the size of an egg to that of a hazel-nut, but occasionally as large as a man's fist. The drug jalap is one of the most common purgatives, but is apt to gripe and nauseate. It has little smell or taste, but produces a slight degree of pungency in the mouth.

Jalapa, or XALAPA (*hå*-lä′på), a city of Mexico in the department of and 52 miles northwest of Vera Cruz. It is the residence of the wealthiest merchants of Vera Cruz, and enjoys a fine climate. The *jalap* root is found abundantly here. Pop. 20,388.

Jalaun (ja-loun′), a town in a district of the same name, in the N. W. Provinces of India, 110 miles S. E. of Agra, in a swampy and unhealthy locality. Pop. 8573.—The district consists of a plain west of the Jumna; area, 1469 sq. miles; pop. 399,726.

Jalesar (jal-ā-sur′), a town of Hindustan, in Etah district, N. W. Provinces. Pop. 15,600.

Jalisco (*hå*-lis′kō), or GUADALAJARA, a State of Mexico, bounded on the west by the Pacific. It is chiefly mountainous, but well watered and wooded, and the climate is healthy. The soil is fertile, and wheat and barley are abundantly produced. The capital is Guadalajara. Pop. 1,153,891.

Jalpaiguri (ja*l*-pī-gu̧′rē), a town of Hindustan, headquarters of district of same name, in Bengal, on the Teesta; pop. 9708.—The district lies south of Bhutan and north of Kuch Behar; area 2962 sq. miles; pop. 787,380.

Jamaica (jå-mā′kå), one of the West India Islands, 80 or 90 miles S. of Cuba, the third in extent of the islands, and the most valuable of those belonging to the British; 146 miles in length east to west, and 49 miles broad at the widest part; area, 4256 square miles. It is divided politically into three counties—Cornwall, Middlesex and Surrey; its capital is Kingston. The island as a whole is very beautiful, and much of it is fertile. The coast is indented with a number of good harbors, of which Port Royal or the harbor of Kingston is the most considerable. The interior is traversed by lofty mountains in all directions; the principal chain, called the Blue Mountains, reaching the height of 7270 feet. The declivities are steep, and covered with stately forests. Jamaica is well watered, having numerous rivers and springs. Earthquakes of a violent character have been frequent. The climate in the districts along the coast is, in most places, exceedingly hot, but is not on the whole unhealthy; on the high lands the air is temperate and pure, while even on the low grounds the heat is greatly moderated by the cool sea-breezes which set in every morning. There are two rainy and two dry seasons. Among the indigenous forest trees are mahogany, lignum-vitæ, iron-wood, logwood, braziletto, etc. The native fruits are numerous, and many of them delicious; they include the plantain, guava, custard-apple, pineapple, sour-sop, sweet-sop, papaw, cashew-apple, etc. The orange, lime, lemon, mango, grape, bread-fruit tree and cinnamon tree have all been naturalized in the island. The chief cultivated vegetable products are sugar, coffee, maize, pimento, bananas and other fruits, ginger and arrow-root. Sweet potatoes, plantains and bananas form the chief food of the blacks. The cinchona tree has been introduced, and is spreading. Of wild animals only the agouti and monkey are numerous. Domestic fowls thrive well, and cattle raising has become profitable. Fish abound in the sea and rivers. Sugar, rum, coffee, dye-woods, fruit and pimento form the chief exports; foodstuffs, coal, clothing and other manufactured goods the chief imports. The government is vested in the governor, assisted by a privy council, and a legislative council composed of fifteen members, nine elected, the others nominated or *ex-officio*. The English Church is presided over by a bishop, assisted by a regular staff of parochial clergy. The Baptists, Methodists, Presbyterians and other Protestant bodies are well represented, and there is a considerable number of Roman Catholics and Jews. Education is rapidly extending; but the general state of morality seems to be low, judging from the fact that the illegitimate births are between 50 and 60 per cent. The pop. (1905) was 806,690, of whom only a few thousand were white, the others of negro descent.

Jamaica was discovered by Columbus in 1494, in his second expedition to the New World. In half a century the cruelty of the Spanish conquerors exterminated the natives. The island was taken by Cromwell in 1655, and ceded to England by the treaty of Madrid in 1670. Since the abolition of slavery the prosperity of Jamaica has greatly decreased. Of late many Chinese and coolies have been employed in agriculture. In 1865 a serious revolt broke out among the blacks at Morant Bay, and was put down with considerable severity by Governor Eyre. Since that time signs of disaffection have disappeared, and a greater state of com-

fort is said to prevail among the inhabitants generally. Politically dependent on Jamaica are the Cayman Islands, and the Turks and Caicos Islands.

Jamaica, a former village of the State of New York, now included in the borough of Queens, New York City.

Jamalpur (*ja*-mäl-pör′), a town of Hindustan, in Monghyr district, Bengal, with large workshops belonging to the East India Railway Co. Pop. about 15,000.—Also a town in Maimansingh district, Bengal, on the Brahmaputra. Pop. 14,727.

James, St., called the *Greater*, the son of Zebedee and the brother of John the Evangelist. Christ gave the brothers the name of Boanerges, or *sons of thunder.* They witnessed the transfiguration, the restoration to life of Jairus' daughter, the agony in the garden of Gethsemane, and the ascension. St. James was the first of the apostles who suffered martyrdom, having been slain by Herod Agrippa A.D. 44. There is a tradition that he went to Spain, of which country he is the tutelary saint.

James, St., called the *Less*, the brother or cousin of our Lord, who appeared to him in particular after His resurrection. He is called in Scripture the *Just*, and is probably the apostle described as the son of Alphæus. He was the first bishop of Jerusalem, and in the first apostolic council spoke against those wishing to make the law of Moses binding upon Christians. The progress of Christianity under him alarmed the Jews greatly, and he was put to death by Ananus, the high priest about A.D. 62. He was the author of the epistle which bears his name.

James, St., of the Sword (*San Jago de la Espada*), a military order in Spain, instituted in 1170 by Ferdinand II, King of Castile and Leon, to stop the incursions of the Moors. The knights had to prove their noble descent for four generations.

James I, of Scotland, one of the Stuart kings, born in 1394, was the son of Robert III by Annabella Drummond. In 1405 his father wished him to be conveyed to France in order that he might escape the intrigues of his uncle, the Duke of Albany, but the vessel in which he was being conveyed was taken by an English squadron, and the prince was carried prisoner to London. Here he received an excellent education from Henry IV and, to relieve the tedium of captivity, he applied himself to those poetical and literary pursuits in which he afterwards so highly distinguished himself. Robert III died in 1406, but James was not allowed to return to his kingdom till 1424. Previous to his departure he married Joanna Beaufort, daughter of the Earl of Somerset, a lady of the blood royal of England. On his return to Scotland he caused the Duke of Albany and his son Murdoch to be executed as traitors, and proceeded to carry on vigorous reforms, and, above all, to improve his revenue and curb the ambition and lawlessness of the nobles. The nobility, exasperated by the decline of their authority, formed a plot against his life, and assassinated him at Perth in 1437. Besides his poem, *The King's Quhair* (or Book), by which he ranks high among romantic poets, two humorous poems, excellent, though coarse, are often ascribed to him—*Christ's Kirk on the Green* and *Peblis to the Play.*

James II, King of Scotland, son of James I, was only seven years of age when his father was assassinated in 1437. During his minority the kingdom was distracted by struggles for power between his tutors, Livingston and Crichton, and the great house of Douglas. In 1449 he married Mary of Guelderland. He later allied himself with the Douglases, but being deprived of all real power, he resolved to free himself from the galling yoke. This he did in 1452 by inducing the Earl of Douglas to come to Stirling Castle, where he stabbed him with his own hand. He then quelled a powerful insurrection headed by the next earl, whose lands were confiscated. In 1460 he infringed a truce with England by besieging the castle of Roxburgh, and was killed by the bursting of a cannon in the 29th year of his age.

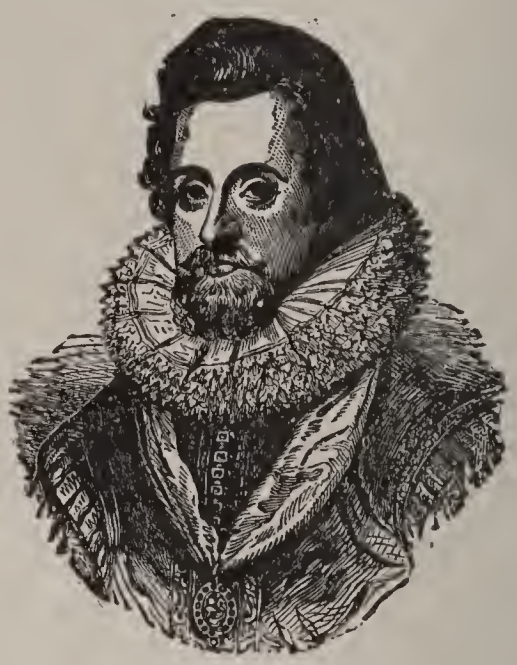
James III, King of Scotland, son of James II, was born in 1453. The kingdom during his minority was governed in turn by Bishop Kennedy and the Boyd family. During his life James was controlled by favorites. Prominent among these was Cochran, a mason, through whom one brother of James was obliged to flee the kingdom, and another was put to death. The nobles seized Cochran and five others and hanged them. A plot was subsequently formed to dethrone the king, and though many peers remained loyal to him the royal army was defeated at Sauchie, near Stirling, in 1488, the king's son being on the side of the victorious nobles. James escaped from the field, but was murdered during his flight.

James IV, King of Scotland, born in 1472, son of James III, was in his sixteenth year when he suc-

ceeded to the throne, having been voluntarily or by compulsion on the side of the nobles who rebelled against his father. During his reign the ancient enmity between the king and the nobility seems to have ceased. His frankness, bravery, skill in manly exercises and handsome person won the people's hearts, and he ruled with vigor, administered justice with impartiality, and passed excellent laws. Henry VII, then king of England, tried to obtain a union with Scotland by politic measures, and in 1503 James married his daughter, Margaret. A period of peace and prosperity followed. French influence, however, and the discourtesy of Henry VIII in retaining the jewels of his sister and in encouraging the border chieftains hostile to Scotland, led to angry negotiations, which ended in war. James invaded England with a large force, and himself and many of his nobles perished at Flodden Field in 1513.

James V, of Scotland, born in 1512, succeeded in 1513, at the death of his father, James IV, though only eighteen months old. His mother, Margaret of England, governed during his childhood but the period of his long minority was one of lawlessness and gross misgovernment. James assumed the reins of government in his 17th year. He married Magdalen, daughter of Francis I of France, and on her death Mary of Lorraine, daughter of the Duke of Guise. Henry VIII, having broken with Rome, and eager to gain over his nephew to his views, proposed an interview at York; but James never came, and this neglect enraged Henry. A rupture took place between the two kingdoms, but James was ill supported by his people, and the disgraceful rout of his troops at Solway Moss broke his heart. He died in 1542, seven days after the birth of his unfortunate daughter, Mary.

James I, of England and VI of Scotland, the only son of Mary, Queen of Scotland, by her cousin Henry, Lord Darnley, was born at Edinburgh Castle in 1566. In 1567 (his mother being forced to resign the crown) he was crowned at Stirling, and his childhood was passed under the direction of the Earl of Mar, and the tuition of the famous Buchanan. He had much trouble with his nobles, a party of whom made him captive at Ruthven Castle in 1582; but a counter party soon set him at liberty. When his mother's life was in danger he exerted himself in her behalf (1587); but her execution took place, and he did not venture upon war. In 1589 he married Princess Anne of Denmark. In 1603 he succeeded to the crown of England, on the death of Elizabeth, and proceeded to London. One of the early events of his reign was the Gunpowder Plot (which see). He soon allowed his lofty notions of divine right to become



James I of England.

known, got into trouble with Parliament, and afterwards endeavored to rule as an absolute monarch, levying taxes and demanding loans in an arbitrary manner. In 1606 he established Episcopacy in Scotland. In 1613 his daughter Elizabeth was married to the elector palatine, an alliance which ultimately brought the present royal family to the throne. He wished to marry his son to Charles, Prince of Wales, to a Spanish princess, but this project failed, and war was declared against Spain. The king, however, died soon after, in 1625. James, though possessed of good abilities and a good heart, had many defects as a ruler, prominent among them being subservience to unworthy favorites and disregard for the kingly dignity. He was also vain, pedantic, and gross in his taste and habits. His name is sullied by the part he played in bringing Raleigh to the block. In his reign the authorized translation of the Bible was executed.

James II, of England, second son of Charles I and of Henrietta Maria of France, was born in 1633, and immediately declared Duke of York. During the civil war he escaped from England and served with distinction in the French army under Turenne, and in the Spanish army under Condé. At the Restoration, in 1660, he got the command of the fleet as lord high-admiral. He had previously married Anne, daughter of Chancellor Hyde, afterwards Lord Clarendon. In 1671 she died, leaving

two daughters, who became successively queens of England. Having openly avowed the Roman Catholic faith, on the Test Act being passed to prevent Roman Catholics from holding public employments he was obliged to resign his command. He was afterwards sent to Scotland as lord high commissioner, where he persecuted the Covenanters. He succeeded his brother as king in 1685, and at once set himself to attain absolute power. A rebellion headed by the Duke of Monmouth (his nephew) was easily put down, and this encouraged the king in his arbitrary measures. He even accepted a pension from Louis XIV that he might more readily effect his purposes, especially that of restoring the Roman Catholic religion. The result of this course of action was the revolution of 1688 (see *England*), and the arrival of William, Prince of Orange. Soon James found himself completely deserted, and having quitted the country he repaired to France, where he was received with great kindness and hospitality by Louis XIV. Assisted by Louis, he was enabled in 1689 to attempt the recovery of Ireland; but the battle of the Boyne, fought in 1690, compelled him to return to France. All succeeding projects for his restoration proved equally abortive, and he spent the last years of his life in acts of ascetic devotion. He died at St. Germain's in 1701.

James III, THE PRETENDER. See *Stuart (James Edward Franeis)*.

James, GEORGE PAYNE RAINSFORD, an English novelist, born in London in 1801. While still very young he manifested a considerable turn for literary composition, and produced, in 1822, a *Life of Edward the Black Prince.* Some years afterwards he composed his first novel, *Richelieu,* which was shown in manuscript to Sir Walter Scott, and published in 1829. Its success determined him towards fiction, and a series of novels, above sixty in number, followed from his pen in rapid succession, besides several historical and other works. Among them may be mentioned *Darnley, De L'Orme, Lord Montague's Page, Philip Augustus, Henry Masterton, Mary of Burgundy, The Gipsy, History of Chivalry, Life of Charlemagne,* etc. He accepted the office of British consul, first at Richmond, Virginia, and afterwards at Venice, where he died in 1860.

James, HENRY, novelist and essayist, was born in New York in 1843. He lived much on the European continent and in England. His novels and tales, which depend for their interest on the portrayal of character rather than on incident, are numerous. Among them are: *Daisy Miller, A Passionate Pilgrim, Roderick Hudson, The Portrait of a Lady, Tales of Three Cities, The Bostonians, A Little Tour in France, Italian Hours,* etc. In his later years his style became involved and intricate, losing much of its early charm through ultra refinement.

James, WILLIAM, psychologist, brother of the above, was born in New York in 1842. After 1872 he was connected with Harvard in professorships of psychology and philosophy, and won eminence in his special field. His *Principles of Psychology* is highly esteemed, and he wrote various other works of value, one of the latest being *Pragmatism—A New Name for Some Old Ways of Thinking.* In his later years he became a convert to spiritualism. He died in 1910.

Jameson (jā'me-son), ANNA, authoress and art critic, maiden name Murphy, was born in Dublin in 1797, and died in 1860. Among her works are: *The Diary of an Ennuyée; Memoirs of the Early Italian Painters; Winter Studies and Summer Rambles in Canada; Sacred and Legendary Art.*

Jamesone (jā'me-sōn), GEORGE, called by Walpole the *Scottish Vandyck,* the son of an architect at Aberdeen, was born there in 1586. He studied under Rubens at Antwerp, where he had Vandyck as a fellow-pupil. Returning to his native country in 1628, he became the most famous portrait painter that Scotland has ever possessed, at least till recent times. He also painted historical pieces and landscapes. His excellence consists in delicacy and softness of shading, and a clear and beautiful coloring. He died at Edinburgh in 1644.

James River, a river of Virginia, which passes the towns of Lynchburg and Richmond, and communicates, through Hampton Roads and the mouth of the Chesapeake Bay, with the Atlantic. Its general course is south of east, and its length is 450 miles. The first English settlement in America was formed at Jamestown, 32 miles from the mouth of this river, in 1607.

James' Bay, the southern extension of Hudson Bay, called from Captain James, who wintered here in 1631-32 while trying to find the N. W. passage. Within it there are numerous rocks and islands, and its navigation is dangerous.

James' Powder, a medicine in which antimony is the most important ingredient.

Jamestown (jamz'town), the site of the first British settlement in the United States. Its locality was on the James River, Virginia, about 32 miles above its mouth. It was burned in the Bacon rebellion of 1676 and only a few ruins remain, including the old church tower. It gave the name to an exposition held near Norfolk in 1907, the three-hundredth anniversary of its settlement.

Jamestown, a city and summer resort of Chautauqua county, New York, on the outlet of Chautauqua Lake, which supplies water-power for several mills. It has extensive manufactures of textiles, furniture, stained glass, saws, iron goods, knitted and worsted fabrics, etc. Pop. 31,297.

Jamieson (jā'mē-son), JOHN, a Scotch philologist and theologian, was born at Glasgow in 1759, educated for the ministry among the Antiburgher Seceders, and after having been settled for a time in Forfar, removed in 1797 to Edinburgh, where he spent the remainder of his life, and died in 1838. The work by which he is chiefly known is his *Etymological Dictionary of the Scottish Language* (1808-09); supplement (1825), which is highly valuable as an extensive collection of Scotch words, phrases and customs.

Jammu (jum-mö'), JAMU, or JUMMOO, a portion of Cashmere (which see).

Jamna. See *Jumna.*

Jamnotri (jum-nö'trē), or JUMNOUTRI, a celebrated place of pilgrimage in Hindustan, in the province of Garhwal, 185 miles N. N. E. of Delhi, at the source of the Jumna, with hot springs 10,849 feet above sea-level.

Jamuna (*ja*-mu̱-nä'), the name of several rivers of Northern India, the chief being the lower section of the Brahmaputra, and that which connects it directly with the Ganges.

Janauschek (jan'ō-shek), FRANCESCA R. M., an eminent actress, born at Prague, Bohemia, in 1830; died in 1904. She gained a high standing as a tragedienne, playing in Germany, England and the United States, and dwelling in the latter country in her later life. She rendered acceptably in English the most exacting roles in Shakesperean tragedy.

Janesville (jānz'vil), a city, capital of Rock county, Wisconsin, on both sides of Rock River, with active trade and manufactures, including large cotton factories, woolen and flour mills, agricultural implements, carriages, furniture, etc. Here is the State School for the Blind. Pop. 13,894.

Janin (zhȧ-naṇ), JULES GABRIEL, French critic, and author of a number of novels and other works, was born in 1804, and died in 1874. He devoted himself to journalism at an early period, and from 1830 till his death he was connected with the *Journal des Débats.* In 1870 he was made a member of the French Academy. His first novel, *L'Ane Mort et la Femme Guillotinée,* appeared in 1829, and was quickly followed by the *Confession; Barnave,* a political novel; *Contes Fantastiques; Contes Nouveaux.* Among other works of his are *Voyage en Italie; Histoire de la Littérature Dramatique; Béranger et son Temps;* etc.

Janina, JOANNINA (yȧn'i-nȧ, yo-ȧn'-i-nȧ), a town in Turkey in Europe, capital of Albania, 425 miles W. S. W. Constantinople, beautifully situated on the margin of a lake stretching along the greater part of its western shore. It has declined since the time when the notorious Ali Pasha resided here. Its fortress and splendid seraglio, built on a promontory jutting down into the lake, are now in ruins. Pop. 26,000.

Janizaries (jȧn'i-za-rēz; Turkish, *Jeni-tcheri,* new soldiers), an Ottoman infantry force, somewhat analogous to the Roman prætorians, part of them forming the guard of the sultan. They were originally organized about 1330, and subsequently obtained special privileges, which in time became dangerously great. The regular janizaries once amounted to 60,000, but their numbers were afterwards reduced to 25,000. The irregular troops amounted to 300,000 or 400,000. Their power became so dangerous and their insurrections so frequent that several unsuccessful attempts were made to reform or disband them. At various times sultans had been deposed, insulted, and murdered by the insurgent janizaries. At last, in June, 1826, they rebelled on account of a proposal to form a new militia, when the sultan, Mahmoud II, having displayed the flag of the Prophet, and being supported by their aga or commander-in-chief, defeated the rebels and burned their barracks, when 8000 of them perished in the flames. The corps was abolished, and a curse laid upon the name. As many as 15,000 were executed, and fully 20,000 were banished. The Nizam, a corps of troops under modern organization, took their place.

Jan-Mayen (yȧn-mī'en), a small volcanic island in the Arctic Ocean, 150 miles from the coast

of East Greenland. In Beerenberg, an extinct volcano, it rises to the height of 6870 feet. The island was discovered in 1611 by the Dutch navigator Jan Mayen, and was used as an Austrian polar station for scientific observations in 1882-83.

Jansen (yän'sen), CORNELISZ, usually known as *Jansenius*. See *Jansenius*.

Jansenists (jan'sen-istz), JAN'SENISM, the sect or party and its doctrines, which owed their origin to the teaching of Jansenius (which see). In his great work *Augustinus*, published in 1640, Jansenius maintained the Augustinian doctrine of free grace, and recommended it as the true orthodox belief, in opposition to the semi-Pelagianism of the Molinists. The book was condemned by Urban VIII in 1642, in the bull *In Eminenti;* but its doctrines were supported by many distinguished French and other theologians, and the scholars of the Port Royal, namely, Nicole, Pascal, and Antoine Arnauld, undertook the defense of Jansenism. Another bull, in which the pope (1653) particularly condemned five propositions from the *Augustinus*, also met with a strong opposition. In 1656 Alexander VII issued a special bull by which the Jansenists were required either to recant or secede from the Roman Catholic Church. It was found impossible to force them to an unconditional subscription of this bull; and in 1668 an agreement with Clement IX, by which a conditional subscription was permitted, obtained for them a temporary repose. The party stood its ground under the protection of Innocent XI (died in 1689), who tolerated them as much as Louis XIV and the Jesuits opposed them. Father Quesnel's *Moral Reflections on the New Testament*—the most universally read book of this period—gave it new support, but also led to the bull *Unigenitus* (in 1713), which condemned 101 propositions from the *Reflections*. This bull excited much indignation in France, and was strongly resisted; but the Jansenists were rigorously censured unless they accepted the bull unconditionally. In consequence great numbers emigrated to the Netherlands, and their power as a party rapidly declined. This was hastened from 1731 by the fanatical excesses of many Jansenists, especially of the Convulsionists (which see) and others, which encouraged ridicule, favored repressive measures, and ultimately extinguished the Jansenists as a party in France. As a sect, they still survive in the Netherlands. They call themselves, by preference, the *disciples of St. Augustine*. Each bishop on his appointment notifies his election to the pope, and craves confirmation. The non-acceptance of the bull *Unigenitus*, however, has caused all their advances to be rejected, and as they have rejected the doctrine of the immaculate conception and the decrees of the Vatican Council, they stand further apart than ever from the orthodox Catholic Church, though between them and the Old Catholics there are friendly relations.

Jansenius (yän-sā'ne-us), CORNELIUS, (properly CORNELISZ JANSEN), a Dutch theologian. He studied at Utrecht, Louvain and Paris; secured a professorship at Bayonne; returned to Louvain in 1617, where he obtained the degree of doctor, and took a prominent part in the affairs of the university. He was appointed professor of Scripture in 1630, and was promoted to the bishopric of Ypres in 1636. In this city he died of the plague in 1638, leaving an unblemished reputation for piety and purity of morals. He had just completed his great work, the *Augustinus*, a book which gave rise to a great religious controversy. See *Jansenists*.

Janssens (jäns'sens), ABRAHAM, a Dutch historical painter, born about 1569; died about 1632. He was the contemporary and rival of Rubens, though the place which he occupies beside him is very subordinate. He is chiefly admired for his coloring and accuracy of design, his most important works being Scriptural scenes. Many of his pictures are in the Flemish churches, while others are in the galleries of Munich, Vienna, Berlin and Dresden.

Januarius (jan-u-ā'ri-us), ST., Bishop of Benevento, was beheaded at Puzzuoli in the beginning of the fourth century, a martyr to the Christian faith, and is honored as the patron saint of the people of Naples, where his body lies buried in the crypt of the cathedral. His head and two vials of his blood are preserved in a separate chapel. These vials are brought near the head of the saint on three festivals each year, notably September 19, the anniversary of the martyrdom. On these occasions, if the blood becomes of a clear red color and moves briskly in the vial, the patron saint is said to be propitious, but by remaining congealed it betokens disaster.

January (jan'ū-a-ri), the first month of the year, consisting of 31 days. It was by the Romans held sacred to Janus, from whom the name was derived. The Roman year originally began with March, and consisted of only

ten months. Numa is said to have added January and February. See *Calendar.*

Janus (jā'nus), an ancient Latin divinity, after whom the first month of the year was named. He was held in great reverence by the Romans, and was represented with two faces, one looking forward, the other backward. All doors, passages and beginnings were under his care. His principal festival was New Year's Day, when people gave each other presents. The temple of Janus, which was open in time of war and closed in time of peace, was shut only three times in the long space of 700 years—once in the reign of Numa, again after the first Punic war, and the third time under the reign of Augustus A.U.C. 744. Vespasian also closed it in A.D. 71.

Janvier (jan'vēr), THOMAS A., author, born at Philadelphia, 1849. He did editorial work on several Philadelphian newspapers, resided for a number of years in Mexico, and made it the scene of several works, as *The Aztec Treasure House, Stories of Old New Spain, Legends of the City of Mexico,* etc. He wrote also *The Uncle of an Angel, In Old New York, The Passing of Thomas, The Dutch Founding of New York,* and various other works. His sister Margaret ('Margaret Vandegrift') wrote a number of juvenile stories and verses, as *Under the Dog Star, Clover Beach,* etc.

Japan (jà-pan'), an island empire in the North Pacific Ocean, lying off the east coast of Asia. It comprises four large mountainous and volcanic islands, viz., Hondo, Kiushiu or Kiusiu, Shikoku or Sikok and Yesso, besides many other islands and islets, and in particular the Loo-Choo or Riu-kiu and the Kurile groups. The largest island, Hondo or Niphon, is 800 miles long, and from 50 to 100 miles broad. By the Japanese Niphon or Nipon is employed to describe the whole empire. The name 'Jipun,' altered to Japan, is the Chinese designation, and it first became familiar to Europeans. The official return gives Japan an area of 147,655 square miles and a pop. (1910), of 59,751,919.

Physical Features.—The Japanese islands form part of the line of volcanic action commencing with the Aleutian Isles and terminating in the islands of Southeastern Asia. The coasts of the larger islands are extremely irregular, being deeply indented with gulfs, bays and inlets, which form magnificent harbors. The surface also is generally uneven, and in many instances rises into mountains of great elevation. The island of Hondo is traversed throughout its whole length by a chain of mountains, the highest peak being Fusi-yama (12,230 feet), a dormant volcano covered with perpetual snow. The volcanic vents are numerous in Yesso, Hondo and Kiusiu, and earthquakes are frequent. The minerals comprise copper, lead, iron, antimony and sulphur; gold and silver are found, though not to a great extent. Coal is mined in various parts. The rivers are of no great length: Tonegawa, the longest, is only about 172 miles. Biwa, in the south of Hondo, is the principal lake, being some 50 miles in length, with an extreme breadth of 20 miles. The harbors most frequented by foreigners are the treaty ports of Yokohama, Hiogo (or Kobé), Nagasaki, Hakodate, Niigata and Osaka.

Climate.—The climate ranges from an almost Arctic cold in the north to a nearly tropical heat in the south. In the island of Yesso winter begins about October and continues to April, its course being marked by severe frosts and snowstorms; while in Yokohama, again, the winter is genial, with a bright sky, and a temperature much like England. From July to September the thermometer often ranges as high as 95° in the shade.

Products.—The vegetation of Japan is very varied, in consequence of its wide range of temperature. Rice of excellent quality, as also wheat, barley, sugar-cane and millet are largely grown; while ginger, pepper, cotton and tobacco are cultivated in considerable quantities. Tea and raw silk are largely produced. The Japanese are skilful gardeners, and the fruits raised include strawberries, melons, plums, persimmons, figs, loquats and oranges. Of flowers and flowering shrubs the camellia, azalea, hydrangea, lilies, peonies, the chrysanthemum, daphne and wistaria are indigenous. The forests are extensive; in the south the palm, banana and bamboo flourish; while in the north, cedar, pine, maple, and the *kadsi* or paper-tree are abundant. The chief domestic animals are the horse, which is small and hardy; the ox, which is used as a beast of burden; the dog, which is held sacred; and the cat, which is of a short-tailed species. Rabbits and guinea-pigs are household pets. Bantam fowls, chickens, ducks and pigeons are reared for food. Of the wild animals, deer are numerous in the north, bears are to be found in Yesso, while boar, wolves, badgers, foxes, monkeys and hares are not uncommon. Birds are plentiful; falcons, pheasants, ducks, geese, teal, storks, pigeons, ravens, larks, pelicans, cranes, herons, etc. Fish is one of the chief foods, the principal varieties being salmon, cod, herring, sole and mullet. There are also tortoises, lizards,

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SILK COCOONS

A Japanese merchant buying silk cocoons. The manufacture of silk is one of the chief industries of Japan.

scorpions and centipedes; and of the insect tribes there are white-ants, winged grasshoppers, and several beautiful varieties of moths.

People.—The Japanese may be regarded as belonging to the great Mongolian family, though ethnologists recognize more than one element in the population. They are generally distinguished by broad skulls and high cheek-bones; small, black eyes, obliquely set; long, black

Japanese Work-people.

hair, and a yellow, or light-olive complexion; some are good looking, and many are well made, active and nimble. They are a frugal, skilful, persevering, courageous race, who combine these characteristics with much frankness, good humor and courtesy. A Japanese gentleman's dress is a loose garment made of silk, gathered in at the waist by a girdle, and extending from neck to ankle; while over this is thrown a wide-sleeved jacket. In the country a short cotton gown is worn, while the lower classes generally wear scant clothing. The hair is shaved off the front part of the head, while on the back and sides it is gathered up into a knot and fastened with long pins. As regards both clothing and hair-dressing the women very much resemble the men. They also paint and powder themselves to excess. Polygamy is not practised, but a husband can have as many concubines as he can afford. The Japanese are a holiday-loving people, and delight in the theater. Their two principal religions are Buddhism and Shintoism. The chief observances of Shintoism are ancestral worship and sacrifice to departed heroes. Buddhism is the popular religion. A considerable number of Christian missionaries are now actively engaged in the country. The Japanese language is dual in its nature. Originally a polysyllabic Mongolian tongue, it has been greatly enriched by the addition of many Chinese words, the latter being much used by the literary and governmental classes. The literature of Japan is extensive, and includes all departments—historical, scientific, biographical, but is especially copious in poetry and romance. Contact with Europe has affected literary production; European and not native writings are now mostly read.

Industries and Trade.—In native and imitative manufactures the Japanese are exceedingly ingenious. Their artistic treatment of copper, iron, bronze, silver and gold is of the finest, while in stone carvings, mosaics, wicker, tortoise-shell, crystal, leather, and especially in wood lacquer-work, they are skilful in the highest degree. Of textile fabrics they excel in cotton-goods, crapes, brocades, and especially in figured silk goods. Paper is largely made, and its uses—from a house to a handkerchief—are manifold. Japanese decorative art is remarkable for patient but facile treatment of bird, beast, and flower; the absence of perspective and chiaroscuro seems even to add to its effect. The modern art productions, however, have been debased by imitations of bad European work. The chief export is silk, tea coming next, while the imports are mostly textile fabrics, sugar machinery, etc. The standard money unit is the gold *yen* or dollar, divided into 100 *sens*. The coinage consists of gold, silver, and copper pieces, from the value of 20 *yens* to 1/10 *sen*. There is also a paper currency. The principal weight is the picul, equal to 133 lbs. avoirdupois.

Government, etc.—The government of Japan till recently was an absolute monarchy, but a new constitution was proclaimed in February, 1889, providing for the establishment of a house of peers, partly hereditary, partly elective, partly nominated by the emperor or mikado (as the ruler is called), and of a house of commons of 300 members, elected by all men 25 years of age, and paying taxes to the amount of 25 dollars annually. There is also a cabinet, which includes the prime minister and the statesmen at the head respectively of the foreign office, the treasury, war, navy, education, public works, religion, justice, and the imperial household. There are resident ministers in most European countries and in the United States. Railways are now used over a length of very near 5000 miles,

with about 18,000 miles of telegraph line, while the postal system throughout the empire is excellent. Education is compulsory, the school age being from the 6th to the 14th year. There is a university at Tokyo, with affiliated colleges. Conscription is the rule, and the army numbers 450,000 men in peace, with a war establishment of 1,500,000. The navy numbers about 150 vessels. The wars with China and Russia, demonstrated Japanese strategy in war, and gave a great impetus to the navy, which now has 11 modern battleships, first class in every sense, and a considerable number of older battleships and of cruisers.

History.—The Japanese profess to have an accurate chronology from 660 B.C., but little confidence can be placed in their annals previous to the tenth century after Christ. A long line of emperors or mikados reigned over Japan, but for some six hundred years all real power was in the hands of the *shogun* or chief minister. Japan was first made known to Europe by Marco Polo, under the title of Zipangu. In 1542 it was visited by Mendez Pinto, representing the Portuguese, and in 1549 the Jesuit missionary, St. Francis Xavier, arrived and converted many of the natives to the Church of Rome. From the overbearing character of the Portuguese traders on the one hand and the jealousy of the Japanese priests, fomented by sectarian troubles, an edict was issued excluding missionaries from the country, and in 1640 the Portuguese were finally expelled and the Christian converts largely massacred. The Dutch East India Company established a trading settlement in 1600, which for more than two centuries formed Japan's sole channel of intercourse with the external world. In 1854 a United States fleet, under Commodore Perry, succeeded in inducing the Japanese to abandon their policy of isolation and since then their country has been rapidly modernized. A treaty was made with the United States, and others soon after with several European nations. These treaties made by the Shogun led to a revolution in the island empire, which ended in victory for the mikado and his restoration to his ancient supremacy, the Shogunate being abolished. A complete change now took place. The Japanese rapidly became converted to western ideas, both political and social. In July, 1894, war was declared with China on the question of their respective claims to Corea. The Japanese successes brought it to a triumphant end in April, 1895. By the treaty of Shimonoseki the terms of peace included recognition of Corean independence, which had been the chief cause of the war, the cession to Japan of Formosa and some smaller islands, with the peninsula of Liao-Tung, including Port Arthur, a large war indemnity, and a very great relaxation of restrictions on foreign industry and commerce in China. The success of Japan was in part negatived by the action of Russia, France and Germany, which countries, by threats of war, forced her to return to China the Liao-Tung Peninsula, obtaining in return only a small increase in the indemnity. The subsequent action of Russia in extending the Trans-Siberian Railway to Port Arthur, leasing this port from China, and increasing her military force in Manchuria, led the Japanese government to insist on a withdrawal of these troops, and in 1904 brought on the Russo-Japanese war (which see). The success of Japan in this great conflict raised the island empire to the level of the leading powers of the world, a position which Japan is making every effort to hold by a rapid increase in her military and naval strength, an alliance with Great Britain, and a remarkable development in commerce and manufacture. Mutsuhito, the ruling mikado, from 1867 to 1912, proved a wise and progressive sovereign. He was succeeded by his son Yoshihito.

Japan Clover (*Lespideza striata*), a perennial plant with trifoliate leaves, indigenous to China and Japan. Introduced to South America about 1850, it has spread with great rapidity, and it is held in favor by many stock-breeders, as the young shoots are greatly relished by cattle.

Japanning (jȧ-pan'ing), the act of applying varnish to such articles as wood, metal, leather and *papier-maché*, in imitation of the lacquered work of Japan and China. The article to be japanned, being made thoroughly dry, is first brushed over with two or three coats of seed-lac varnish to form the *priming*. The next coat of varnish is mixed with the *ground tint* desired, and where a design is intended, it is now painted with colors. The whole is then covered with additional coats of varnish, which are dried and polished as applied. Shell-lac varnish or mastic varnish is employed, unless where the fineness or durability of the work requires the use of copal dissolved in alcohol. See *Lacquering*.

Japheth (jā'feth), the second son of Noah (Gen., ix, 24). His descendants, according to Gen., x, 5, peopled the isles of the Gentiles, and thus Japheth is often considered the ancestor of most European races.

Japura (*hà-pö′rà*), or CAQUETA (*kà-kā′tà*), a large river of South America, an affluent of the Amazon. It has its sources in the mountains of Colombia and its whole length is upwards of 1000 miles, the last 350 being in Brazilian territory. The navigation is interrupted by a great cataract, which occurs in lat. 1° 10′ s.; lon. 72° 20′ w.

Jardine (jar′din), SIR WILLIAM, a practical zoölogist of high and varied attainments, was born in Edinburgh in 1800, and died in 1874. He is best known as the editor of the celebrated *Naturalists' Library*. His chief works comprise a history of the *British Salmonidæ*, the *Ichnology of Annandale*, etc.

Jardinière (zhàr-dēn-yār), an ornamental stand for growing plants, used in decoration of an apartment.

Jargon (jàr′gun), JAR′GOON, a mineral, usually of a gray or greenish-white color, in small irregular grains, or crystallized in quadrangular prisms surmounted with pyramids, or in octahedrons consisting of double quadrangular prisms.

Jargonelle (jàr-gu-nel′), a variety of early pear, of fine quality, so called from resembling in color the mineral jargon.

Jarl (yârl), a word of Scandinavian origin, the same as *carl*, and applied in the early history of the Northern European kingdoms to the lieutenants or governors appointed by the kings over each province.

Jarnac (zhàr-nàk), a town of France, in the department of and on the river Charente, where a battle was fought March 13, 1569, between the Catholics under the Duke of Anjou, and the Huguenots under the Prince of Condé. The Protestant forces were defeated. Pop. (1906) 4493.

Jarool. See *Bloodwood*.

Jaroslau (yà′ro-slou), a town of Galicia, Austria, on an affluent of the Vistula, 62 miles W. N. W. of Lemberg, with a castle and a handsome cathedral, manufactures of woolens and linens, etc. Pop. 22,614.

Jaroslav (yà′ro-slaf), a town of Russia, capital of the government of same name, on the Volga, 162 miles northeast of Moscow. It is the see of an archbishop, and has a theological seminary and a college. Pop. 70,610.—The government has an area of 13,000 square miles and a pop. of 1,072,478. The surface is generally flat and in several places very marshy. It is watered by the Volga and other rivers. The soil is by no means fertile, and the grain produced falls short of the home consumption.

Jarrah (jar′a), a timber tree of West Australia, the *Eucalyptus marginata*, (or *rostrā*), yielding a very durable wood, useful for railway sleepers, jetties, etc., not being liable to the attack of the white ant and the shipworm.

Jarrow (jar′rō), a town of England in Durham, on the Tyne, 6 miles below Gateshead. Its rapid growth from a village to a large town is due to the development of its shipbuilding and iron-smelting industries. The town contains a mechanics' institute, an infirmary, and the church of St. Paul's, where the venerable Bede was buried, and where some of his relics are still preserved. It gives name to a parliamentary division of Durham. Pop. 33,732.

Jasher (ja′sher), BOOK OF, a lost Hebrew work, twice mentioned in the Bible (Josh., x, 13, and II Sam., i, 18), and about which various conjectures have been made. Some authorities suppose that it was a series of annals; others that it was a Hebrew minstrelsy celebrating the exploits of the national heroes. Whatever its contents may have been, it seems from the specimens preserved to have been metrical in form.

Jasmin (zhàs-maṇ), JACQUES, or JAQUOU JAUSMIN, the chief modern Provençal poet of France, inheritor of the language as well as the spirit of the troubadours, was born in 1798, and died in 1864. Himself of humble parentage, and by trade a hair-dresser, all his poems and songs are written in the peasants' patois of the Garonne. His poetry deserved and acquired more than a local celebrity, and was warmly welcomed not only in Southern France, but throughout the whole of Europe. His principal works are *Lou Chalibari* ('The Charivari'), a mock-heroic poem; *L'Abuglo de Castel Cuillé* ('The Blind Girl of Castel Cuillé'), his masterpiece in poetry, which has been translated by Longfellow; *Las Papillotos de Jasmin* ('The Curl-papers of Jasmin'); and *Lous dous Frays-bessous* ('The Two Twin-Brothers'), 1847.

Jasmine (jas′min), JAS′MIN, the popular name of plants of the genus *Jasmīnum*. They are elegant, branched, erect or climbing shrubs, with imparipinnate, trifoliate, or simple leaves, and (usually cymose) white or yellow flowers, from some of which delicious perfumes are extracted. There are about 100 species, most of them Asiatic; some

occur in south and a few in tropical Africa, while one is a native of South-

Common White Jasmine.

ern Europe. The Carolina jasmine is *Gelsemium nitidum*. Also written *Jessamine*.

Jason (jā'sun), in Greek legend, a king of Iolcos in Thessaly, celebrated for his share in the Argonautic expedition. On his return to Iolcos with Medea as his wife, he avenged the murder of his parents and his brother by putting Pelias to death. Unable to retain possession of his throne, however, he fled to Corinth, where, after some time, he married Glauce (or Creusa), daughter of the king, and put away Medea and her children. (See *Medea*.) Different accounts, of legendary character, are given of his death. See *Argonauts*.

Jasper (jas'per), an impure opaque colored quartz, less hard than flint or even than common quartz, but which gives fire with steel. It is entirely opaque, or sometimes feebly translucent at the edges, and presents almost every variety of color. It is found in metamorphic rocks, and often occurs in very large masses. It admits of an elegant polish, and is used for vases, seals, snuff-boxes, etc. There are several varieties, as red, brown, blackish, bluish, Egyptian. —*Agate jasper* is jasper in layers with chalcedony.—*Porcelain jasper* is only baked clay.

Jassy (yåsh'shi), a town of Roumania, in Moldavia, on the Bachlui, several miles from the Pruth. It is built on two hills, and covers a large space, the houses being generally provided with gardens. It has a university, a museum with a public library, a theater, several hospitals, fine hotels and shops. There are few manufactures, but the trade is of some importance, and a great deal of business is done at the fairs. Pop. 78,067, 400,000 being Jews.

Jastrow (yås'trov), MORRIS MORDECAI, a Hebrew scholar, was born at Rogasin, Russian Poland, in 1829; died in 1903. He removed to the United States in 1866 and became a rabbi in Philadelphia. He wrote *Four Hundred Years of Jewish History*, *Episodes of Jewish History* and a *Complete Talmudic Dictionary*. Two of his sons are prominent as scholars and authors:—JOSEPH, born in 1863, professor of psychology since 1893 in the University of Wisconsin, and author of *The Subconscious* and other works on psychology.—MORRIS, born in 1861, professor of Semitic languages in the University of Pennsylvania, the author of various works, and a recognized authority on Semitic religions, languages and literatures.

Jasz-Berény (yäs-be'rān'y), a market town of Hungary, 38 miles E. N. E. of Buda-Pest, on both sides of the Zagyva. Pop. 26,791.

Jataka (jå'ta-ka), a celebrated Pali work of about the third century A.D., containing legends relating to the birth of Buddha, and much prized by the Buddhists.

Jatamansi (jå-tä-man'si), an East Indian name for spikenard.

Jateorhiza (jā-ti-o-rī'za), the genus of plants to which calumba belongs.

Játiva (*hå*-te'vå), a city of Spain, province of and 36 miles s. s. w. Valencia, near the confluence of the Guardamar and Albayda. Pop. 12,600.

Jatropha (jat'ro-fa), a genus of woody plants with alternate stipulate leaves and cymes of small flowers, belonging to the nat. order Euphorbiaceæ, inhabiting the tropical parts of America. The roots of *J. Manihot* yield manioc or cassava. *J. elastica* yields an elastic substance used as caoutchouc.

Játs (jäts), an Indian race occupying a large part of the Punjab and half of the Rajput States. They are hardy, industrious, agricultural people, rearing large flocks of camels in the desert districts of Sind. Their religion varies with locality, and embraces Brahmanism, the Sikh tenets and Mohammedanism.

Jauer (you'ėr), a town of Prussia, province of Silesia, 10 miles s. s. E. of Liegnitz, on the Neisse, with manufactures of cigars, cloth, worsted, leather, etc. Pop. 13,024.

Jaundice (jân'dis), is not specifically a disease, but is rather the indication of bile-coloring matter in the blood, shown by a greenish-yellow color of the skin. This is caused either by disease of the liver, which prevents that organ from separating bile pigments from the blood, or is due to some obstruction in the bile ducts leading to the intestines. The accompanying symptoms are constipation, colic pains, nausea, headache, languor and itching of the skin. The yellow color first appears on the whiter parts of the body, as the eye, the neck, the chest, etc. From being a mere tinge of yellow it deepens to a dark orange, and sometimes greenish hue. Whether these symptoms are trifling or serious depends entirely on the cause; due attention to diet, with mild laxative medicines, will often prove beneficial. Besides the milder, there is also a malignant form of jaundice which usually ends fatally.

Jaunpur (joun-pör'), a town of India, N. W. Provinces, on the river Gúmti, over which there is a fine bridge. It is an old town, and has some beautiful specimens of architecture. Pop. 42,771.—The district has an area of 1554 sq. miles; pop. 1,202,920.

Jaunting-car (jânt'ing), a light car used in Ireland in which the passengers ride back to back on folding-down seats placed at right angles to the axle, the occupants having their feet near the ground. There is generally a 'well' between the seats for receiving luggage, and a seat in front for the driver.

Java (jä'va), an island in the Indian Archipelago, the chief of the Dutch colonial possessions; capital Batavia. It is separated by the Strait of Sunda from Sumatra, and by that of Bali from Bali, and extends about 630 miles from east to west; greatest breadth, 126 miles; area, 48,830 square miles. Java and the smaller adjacent island of Madura are divided into twenty-two provinces or residences, of which the pop. in 1905 amounted to 30,098,008. Volcanic mountain chains running from east to west, and rising to such points as Semiru (12,250 feet) and Slamat (11,320 feet); low-lying marshy tracts in the north, with such safe land-locked harbors as Batavia and Surabya; in the south a rocky unbroken coast washed by the heavy surf of the Indian Ocean,—these are its chief characteristics. Volcanic eruptions are not infrequent, the latest being in 1883, when much damage was done to life and property. The mountains, covered with large forests, are separated by exceedingly fertile valleys. With the exception of marshy tracts the climate is as salubrious as that of any other intertropical country; and the more elevated regions are even healthy. The vegetation is varied. Rice is the chief cereal, but coffee and sugar are the staple products; spices are also grown, and some cotton is raised. Other products are cochineal, pepper, tobacco and tea. The famed poison tree, or upas (*Antiaris toxicaria*), is a noted Javanese plant. The forests consist mainly of teak. There are about 100 kinds of mammalia inhabiting Java. These include the one-horned rhinoceros, tiger, panther, tiger-cat, wild hog, several kinds of deer, several kinds of monkeys (but not the orang-outang, which occurs in the neighboring island of Borneo), and enormous bats. The ox, the buffalo and the goat are among the domestic animals. Birds are numerous. Serpents of a venomous kind are frequent, as also are crocodiles, lizards and the land tortoise. The native population belong to the Malay race, and are brownish yellow in complexion, with long, thick, black hair. They are sober, patient and industrious, but quick to avenge affront. In religion they are nominally Mohammedan. The great mass are devoted to agriculture, living in villages each governed by a native chief. Most of the land belongs to the Dutch government, which obtains a large revenue from the island. Till lately it was the custom to utilize the forced labor of the natives in what was called the 'culture system.' The principal exports are coffee, sugar, tea (the production of which is constantly increasing), tin, rice, cinchona, indigo, spices, tobacco, hides and india-rubber. Railways have been introduced, and telegraphic communication is developing rapidly. A governor-general rules Java and the whole of the Dutch East Indies. The history of Java is unknown previous to the eleventh century, when the Hindus founded a dynasty and converted the natives to Brahmanism. This was overthrown by an invasion of the Mohammedans in 1478. They were succeeded by the Portuguese, who arrived in 1511, and these were followed by the Dutch in 1595, who wrested from them the supremacy.

Javelin (jav'e-lin), a short spear thrown from the hand, and in ancient warfare used by both horse and foot soldiers. The Roman javelin (*pilum*) had a barbed iron head and a wooden shaft, the whole length being nearly 7 feet.

Jaxartes (jaks-ar'tēz). See *Sir-Daria*.

Jay (jā), a genus and subfamily of birds belonging to the family of the crows (Corvĭdæ). The jays have the upper mandible or bill notched or indented near its tip, and the feathers on the top of the head are erectile, and can be elevated at will, to form a kind of crest. These birds are readily domesticated, possess a harsh grating note, and are admirable mimics. They feed on fruits, seeds, worms, insects and the eggs and young of other birds, etc. The common or European jay (*Garrŭlus glandarius*) is the size of an ordinary pigeon, the general color is a light brown inclining to red, while the larger or primary wing-feathers are of a brilliant blue, marked out by bands of black. The blue color reaches its highest brilliancy in the North American blue jay (*Garrŭlus Cyanūrus cristātus*), which otherwise closely imitates its European representative both in size and habits. The blue jay is exceedingly well known in the United States. Another American jay is the Canada jay or 'whiskey jack' (*Perisoreus canadensis*), a bird of rather somber coloring, but of the bold, noisy and active habits of others of the jays.

Common Jay (*Garrŭlus glandarius*).

Jay, John, an American jurist and statesman, born in 1745; died in 1829. In 1766 he was admitted to the bar, and in 1774 was chosen a delegate to the first American Congress, which met at Philadelphia. He was a member of the second Congress, and in 1778 he was appointed minister plenipotentiary to Spain. In 1782 he was appointed one of the commissioners to negotiate a peace with Britain, and, along with Adams and Franklin concluded a treaty with the British. Returning to the United States he was appointed head of foreign affairs, and afterwards chief justice. In 1794 he was sent as envoy extraordinary to Great Britain, and concluded a treaty which has been called after his name, and $1,000,000 was given to Americans on account of illegal captures by British vessels, the E. boundary of Maine was fixed, etc. The treaty excited bitter opposition on the part of the party that favored France, but was finally accepted. While absent in England he was elected Governor of New York, and after filling two terms was nominated and confirmed in his former office of Chief Justice of the Supreme Court. This honor he declined and spent the remainder of his life in privacy.

Jazyges (ja-zi'gez), a Sarmatian tribe, composed of bold, savage horsemen, dwelling in wagons and tents, its home being to the north of the Sea of Azov. In the first Christian century they moved westward to Hungary, whence they kept up a fierce warfare with the surrounding peoples. Their power was finally broken by the Huns and Goths. Hungary has a district named Jazygia, but its Magyar inhabitants have no connection with the ancient Jazyges.

Jeannette (jen'net), a borough of Westmoreland county, Pennsylvania, on the Pennsylvania R. R., 4 miles W. of Greensburg. It has manufactures of flint and window glass, chemicals and electrical supplies. Pop. 8077.

Jeannette Expedition. See *North Polar Expeditions.*

Jebb (jeb), Richard Claverhouse, Greek scholar, was born at Dundee, Scotland, in 1841. Educated at St. Columba's College, Dublin, the Charterhouse, London and Cambridge University, he was graduated as senior classic at Trinity College in 1862. In 1869 he became public orator of that university, and in 1875 he was called to fill the Greek chair in Glasgow University, which he resigned in 1889, on being appointed Greek professor at Cambridge. His best-known works are *The Attic Orators; Modern Greece; Life of Richard Bentley; Homer; Introduction to the Iliad and Odyssey;* and his admirable edition of Sophocles, (6 vols. 1883-97).

Jeddo. See *Tokio.*

Jefferson (jef-er-sun), Joseph, actor, born in Philadelphia, Pennsylvania, in 1829. After the usual career of a strolling actor, in 1858 he came forward prominently as *Asa Trenchard* in '*Our American Cousin*,' which ran for more than 150 nights. His great part, however, was that of '*Rip Van Winkle*,' in which his success was phenomenal, and which he continued to play almost interruptedly for many years to admiring audiences. He died April 23, 1905.

Jefferson, Thomas, the third President of the United States,

was born in 1743, at Shadwell, in Albemarle county, Virginia. He studied for two years at the college of William and Mary, Williamsburg, and then commenced the study of law. In 1769 he was elected a member of the provincial legislature, and in 1775 he took his seat for the first time in Congress. It was he that drew up the draft of the Declaration of Independence, which (in a slightly modified form) was signed on July 4, 1776. In 1779-81 he was governor of Virginia. In May, 1784, Congress elected him minister plenipotentiary to France, in addition to Adams and Franklin; next year he was appointed sole minister, and his residence in Europe lasted about five years. On his return he was appointed Secretary of State by Washington, an office which he continued to fill until the end of 1793, when he resigned in consequence of dissensions with Hamilton. In 1796 he was elected Vice-President of the United States; but he was seldom consulted by the President, and he was out of harmony in political views with the government. In 1800 he was elected President, defeating John Adams, the former President. The most important public act of his administration was the purchase of Louisiana from France, an act which enormously extended the area of the United States. In 1809 he retired to private life at his residence of Monticello, in Virginia, where he died on July 4, 1826, the fiftieth anniversary of the Declaration of Independence, and almost at the same hour as John Adams, who had been with him on the committee that drew up this great State paper. Jefferson was the acknowledged head of the Republican party, as then called (the present Democratic party), from the period of its organization. He published *Notes on Virginia*, with many and various essays on political and philosophical subjects, and a *Manual of Parliamentary Practice*, for the use of the Senate of the United States.

Jefferson City, a city of Missouri, capital of the State and of Cole county, on the Missouri River, about 150 miles from its mouth, and 125 miles W. of St. Louis. It is built on elevated ground, and in addition to the State house, has a State library, State prison and other public institutions. There are various manufactures and coal and iron are found in the vicinity. It is a general trade center. Pop. 11,850.

Jeffersonville, a city of Indiana, capital of Clark county, on the Ohio River, opposite Louisville, Kentucky, 108 miles S. of Indianapolis. It contains the Jefferson depot for army supplies, the southern State prison, extensive car-works, iron, hollow-ware and chain works, trunk and slat factories. A fine bridge connects it with Louisville and several railroads here cross the river. Pop. 10,412.

Jeffrey (jef'rē), Francis, Lord, a Scottish judge and critic, was born at Edinburgh in 1773, and died in 1850. He was educated at Edinburgh high school, the University of Glasgow and Queen's College, Oxford, and passed advocate in 1794. He took part in establishing the *Edinburgh Review* in 1802 (with Sydney Smith, Lord Brougham and others), and after two numbers had been issued was installed as its editor, a position he held for twenty-six years. In 1831 he was made lord-advocate, and he sat for several years as member of parliament for Edinburgh. He was made a lord of Session in 1834, and continued during a period of sixteen years to be one of the ablest and most popular judges of the supreme court in Scotland.

Jeffrey of Monmouth. See *Geoffrey.*

Jeffreys (jef'rēz), George, Baron, an infamous English judge, commonly known as *Judge Jeffreys*, was born in 1648, and died in the Tower in 1689. Soon after commencing his professional career he was chosen recorder of London; and he was appointed, successively, a Welsh judge and chief justice of Chester, created a baronet in 1680, and later appointed chief justice of the King's Bench. He was one of the advisers and promoters of the arbitrary measures of James II, and for his sanguinary and inhuman proceedings against the adherents of Monmouth on the 'bloody western circuit,' was rewarded with the post of lord high-chancellor (1685). On the arrival of the Prince of Orange, the chancellor, who had disguised himself as a seaman, was detected and carried before the lord-mayor, who sent him to the lords in council and by whom he was afterwards committed to the Tower.

Jehoshaphat (je-hosh'a-fat), son of Asa, and fourth king of Judah, 915-890 B.C. He was noteworthy in his strenuous endeavors to abolish the use of idols. Jehoshaphat denotes 'Jehovah's judgment.'

Jehovah (je-hō'va; Heb. *Yahveh*), the popular pronunciation of the sacred name of God among the Hebrews, represented in the text of the Old Testament by the four consonants J (or Y), H, V, H. The Hebrews cher-

ished the most profound awe for this name, and this sentiment led them to avoid pronouncing it, and to substitute the word *Adonai*, which signifies *the lord*, which custom still prevails among the Jews. In some portions of the Pentateuch Jehovah is the name regularly applied to God, in others Elohim: this has led to a theory of there being two authors respectively for these portions. See *Elohim*.

Jehu (je'hö), the founder of the fifth dynasty of the kingdom of Israel. He was a commander in the army of Jehoram, when Elisha sent one of the 'children of the prophets' to consecrate him king of Israel at Ramoth-Gilead (B.C. 895). He immediately attacked Jehoram, whom he slew in battle, and then entered upon a work of extermination in which were slain seventy of Ahab's children and forty-two brothers of Ahaziah, king of Judah. He died after a reign of twenty-eight years. His name occurs more than once on the monuments discovered at Nineveh.

Jeissk. See *Ieisk*.

Jejunum (je-jö'num; Lat. *jejunus*, empty), the second portion of the small intestine, succeeding the *duodenum*, and so named from its generally being found empty after death. See *Intestine*.

Jelabuga (ye-lä'bö-go), a town of Russia, government Viatka, on the Kama, with copper mining and some manufactures. Pop. 9776.

Jelalabad (jel-à-là-bàd'), a town of Afghanistan, near the right bank of the river and 75 miles E. N. E. of the town of Cabul. It was the scene of a successful resistance to an army of Afghans by a handful of British troops under Sir Robert Sale, in the winter of 1841-42. Pop. about 3000.

Jeletz. See *Ieletz*

Jelly (jel'i), a name for such substances as are liquid when warm, but which coagulate into a gelatinous mass when cold. Animal jelly is prepared from the soft parts of animals, and even from bones when sufficiently crushed. It is a colorless, elastic, transparent substance without taste or smell, and which is soluble in warm water. Analysis shows that its constituents are carbon, hydrogen, nitrogen, with a possibility of sulphur. Vegetable jelly is prepared from the juice of unripe fruit heated in a solution of water to 40° C. This extract when boiled with sugar forms a pleasant and wholesome substance. Doctors now incline to the opinion that animal jelly is less nourishing than ordinary animal food.

Jelly-fishes, the popular name of certain cœlenterate animals, of the class Hydrozoa, found in the sea, and often familiarly called Sea-blubbers and Sea-nettles, from their appearance and stinging property. When in the water they present a singularly beautiful appearance, one of the most common resembling a clear crystalline bell, which swims gracefully through the water by alternately expanding and contracting its body. They are very voracious, and move upon their prey (minute animals) with great rapidity, seizing it with their long, stinging tentacles. The phosphorescence of the sea is to some extent explained by the pale light which they diffuse in the darkness. See *Medusidæ*.

Jelly-fish (*Dactylometra Quinquecirra*).

Jelum. See *Jhelum*.

Jemappes (zhė-màp), a village of Belgium, in Hainault, near Mons, on the Scheldt, celebrated as the place of the first great battle in the French revolutionary war, fought November 6, 1792, when the French under Dumouriez defeated the Austrians.

Jena (yā'nà), a town of Germany, in the grand-duchy of Saxe-Weimar, 12 miles east of Weimar, on the Saale, a place of little importance except for

its university, which was opened in 1558. It has in all 94 professors and lecturers, an anatomical theater, botanical garden, zoölogical museum and other scientific collections, observatory, library of 200,000 volumes, and about 600 students. On October 14, 1806, the Prussians (70,000 men) under Prince Hohenlohe were defeated here by the French under Napoleon (90,000 men). Pop. 26,355.

Jenikale. See *Yenikale.*

Jenisei, a river of Siberia. See *Yenisei.*

Jenner (jen'er), EDWARD, an English physician, celebrated for having introduced the practice of vaccination as a preventive of the smallpox. He was born at Berkeley in Gloucestershire in 1749; studied at London under the celebrated anatomist John Hunter, and afterwards settled in Gloucestershire as a medical practitioner. About 1776 the belief common among the peasants that casual cowpox acquired in milking cows was a preventive of smallpox caused him to direct his inquiries to the subject, and led to the introduction of the process of vaccination in 1796. His method at first met with great opposition from the medical profession, but was ultimately universally accepted both by his own and foreign nations. Parliamentary grants to the extent of over £30,000 were made to him, and congratulatory addresses were sent to him by continental monarchs. He died at Berkeley in 1823. He published an *Inquiry into the Causes and Effects* of *Cowpox* (1798), *Further Observations on Variolæ Vaccinæ or Cowpox* (1799), and a celebrated paper on the cuckoo in the *Philosophical Transactions.* See *Vaccination.*

Jenner (jen'er), SIR WILLIAM, born at Chatham in 1815, was educated at University College, London, where he was graduated M.D. in 1844. He became in 1848 professor of pathological anatomy, and in 1857 of clinical medicine in the University College; in 1861 physician to the queen; in 1862 professor of the principles and practice of medicine in University College; in 1868 he was made a baronet, and in 1881 was elected president of the College of Physicians. Dr. Jenner wrote a number of papers on specific diseases, and was the first to establish the difference in kind between typhus and typhoid fevers. Died in 1898.

Jennings, SARAH. See *Marlborough, Duke of.*

Jenolan Caves, a series of great caves in the limestone strata of the blue Mountains of New South Wales, 100 miles W. of Sydney. Discovered in 1841, they were made a government reservation in 1866. In grandeur, magnitude and variety of cave scenery they approach the Mammoth Cave of Kentucky.

Jephthah (jep'thâ), one of the Hebrew judges, who defeated the Ammonites, but having rashly made a vow that if he was victorious he would sacrifice to God as a burnt-offering whatever should first come to meet him from his house, he was met on his return by his daughter, his only child, whom he sacrificed, in consequence, to the Lord (Judges, xi, 29, 40). Some commentators have maintained that this meant devoting her to perpetual virginity in the tabernacle. Jephthah ruled six years as a judge and general (Judges, xi, xii). The sacrifice of Jephthah's daughter is the subject of Handel's last oratorio, and of a Latin drama by George Buchanan.

Jerboa (jėr-bō'a; *Dipus*), a genus of small animals belonging to the order Rodentia or Gnawers, having extremely long hind limbs, which gives them an extraordinary power of leaping, so that their movement seems more like flying than running. The forelimbs are armed with short, powerful claws, with which they excavate their burrows and extract the roots on which they chiefly live. They are gregarious and nocturnal in their habits, and hibernate during the colder seasons. The jerboas are found chiefly in Asia and Northern Africa. The typical species is the Egyptian form (*Dipus Ægyptius*).

Egyptian Jerboa (*Dipus Ægyptius*).

Jereed (je-rēd'), a wooden javelin about 5 feet long, used in Persia and Turkey, especially in mock fights.

Jeremiah (jer-e-mī'a), the second of the great prophets of the Old Testament, flourished during the darkest period of the Kingdom of Judah, under Josiah, Jehoahaz, Jehoiakim, Jeconiah and Zedekiah. He was called to the prophetic office about 629 B.C., in the reign of Josiah, and lived to see the capture of Jerusalem by Nebuchadnezzar in 586 B.C., who offered him a home at Babylon, but he preferred to stay among the wretched remnant of the people left in Judah. He is said to have been stoned to death in Egypt by some of his country-

men, who were irritated by his rebukes. He wrote two Old Testament books, the *Prophecies of Jeremiah* and the *Lamentations*. The text of the prophecies is in a somewhat confused state, there being no chronological order. Jeremiah wants the dignity and splendor of Isaiah, but exhibits great tenderness and elegiac beauty of sentiment. Some critics also attribute to him the book of Deuteronomy and several of the Psalms. See also *Jews*.

Jerez, or XEREZ (*he*-reth′), de la Frontera, a town of s. w. Spain, in Andalusia, province of Cadiz, 16 miles N. N. E. of Cadiz. It is a well-built and flourishing town, with some handsome edifices, chiefly churches and the Alcazar, an old Moorish castle in ruins. It is noted for its wine, well known under the name of sherry, which is exported in large quantities. Pop. 63,473.

Jerez de los Caballeros (or XEREZ; kȧ-vȧl-yā′-rōs), a town of Spain, province Badajoz, partly surrounded by a wall, which dates from the time of the Moors. Pop. 10,271.

Jer-falcon. See *Falcon*.

Jericho (jer′i-kō), a considerable town of ancient Judea, on a plain about 18 miles N. E. of Jerusalem, noted, especially in Solomon's time, for its balsam gardens and its thickets of palm-trees and roses, and carrying on a flourishing trade in balsam and spices. It was the key of Palestine, and was therefore invested and taken by the Israelites, who had passed the Jordan under Joshua to conquer this country. Its site at the present is occupied by the small village of Riha.

Jericho, ROSE OF (*Anastatica hierochuntica*). See *Rose of Jericho*.

Jerked Beef, from the Chilian word *charqui*, beef cut into strips of about an inch thick, and dried in the sun to preserve it. It is used in Chile and other parts of South America, and has been tried in Australia. When well prepared it will keep for a great length of time.

Jerkin-head, in architecture, the end of a roof when it is formed into a shape intermediate between a gable and a hip, the gable rising about halfway to the ridge, so as to have a truncated shape, and the roof being hipped or inclined backwards from this level.

Jeroboam (jer-o-bō′am), the name of two kings of Israel.—JEROBOAM I, the son of Nebat, on Solomon's death (973 B.C.) was made king of the ten tribes who separated from Judah and Benjamin. He made Shechem his capital, forbade his subjects to resort to the temple at Jerusalem, and set up golden calves at the shrines of Dan and Bethel. He died in the 22d year of his reign.—JEROBOAM II, the most prosperous of the kings of Israel, reigned 823-782 B.C. He repelled the Syrians, took their cities of Damascus and Hamath, and reconquered Ammon and Moab. But licentiousness and idolatry were prevalent during his reign. The authorities for the history of his time are II Kings, I Chron., Amos, and Hosea.

Jerkin-head Roof, Boscombe, Hants.

Jerome (jer′ōm), JEROME K., author, born at Walsall, England, in 1861. His writings are mainly of a humorous character, the most successful of them being *Three Men in a Boat*. Others are *Idle Thoughts of an Idle Fellow*, *On the Stage and Off*, *Novel Notes* and several plays and farces.

Jerome, ST., full name EUSEBIUS HIERONYMUS SOPHRONIUS, one of the most learned fathers of the Latin Church, was born sometime between 331 and 345 in Dalmatia, of wealthy parents. He was baptized in Rome, went, in 373, to Antioch in Syria, and in 374 retired to the desert of Chalcis, where he passed four years in severe mortifications and laborious studies. He left his solitude to be ordained presbyter at Antioch, went to Constantinople to enjoy the instruction of Gregory of Nazianzen, and in 382 returned to Rome, where his expositions of the Holy Scriptures gained him many adherents, especially among the rich and noble ladies, two of whom, St. Marcella and St. Paula, became celebrated for their piety. St. Paula accompanied him in 386 to Bethlehem, where she founded four convents, in one of which Jerome remained till his death about 420. His Latin version of the Old Testament from the original language was the foundation of the Vulgate. He took an active part in many controversies, notably those regarding the doctrines of Origen and Pelagius.

Jerome of Prague, a Bohemian dissenter, born about 1360-70, in faith and sufferings the companion of the famous John Huss. Together they made a vigorous crusade

against the dissoluteness of the clergy, the worship of relics, etc. When Huss was imprisoned in Constance, Jerome hastened to his defence, but was seized and carried thither in chains (1415). After much suffering he consented to recant his heresies, but on being subjected to a new examination solemnly retracted his recantation, and made a vigorous vindication of the principles of Huss and Wickliffe. On May 30, 1416, he was burned at the stake, and his ashes were thrown into the Rhine.

Jerrold (jer'old), DOUGLAS, an English humorist and play-writer, born in 1803, the son of the manager of the Sheerness Theater. After being for a short time a midshipman, he was bound apprentice to a printer in London. His first play, *More Frightened than Hurt* (1818), was not at first successful, but his *Black-eyed Susan* (1822) ran for 300 successive nights at the Surrey Theater. Jerrold's subsequent dramas were the *Rent-day*, *Nell Gwynne*, *The Housekeeper*, *The Prisoner of War*, *Bubbles of a Day*, *Time Works Wonders*, *St. Cupid*, *The Catspaw*, *The Heart of Gold*, and several others. He contributed extensively to periodical literature, founding and conducting successively the *Illuminated Magazine* and *Douglas Jerrold's Shilling Magazine*, and subsequently editing *Lloyd's Weekly Newspaper*. To *Punch* he contributed his inimitable *Mrs. Caudle's Curtain Lectures*, *Punch's Letters to his Son*, etc. Though a vigorous master of satire and repartee, his sayings had no personal malevolence. He died in 1857.

Jersey (jėr-zi), the largest and most valuable of the Channel Islands of England, about 15 miles off the northwest coast of France; greatest length, east and west, about 12 miles; greatest breadth, 7 miles; area, 44.87 sq. miles. Its coast, particularly on the north, is extremely rugged and precipitous, is deeply indented all round, and has a number of good bays and harbors, the chief of which are St. Aubin and St. Helier. The island is fertile, abundantly wooded and well cultivated. The climate is peculiarly mild and agreeable. Wheat is the principal cereal raised, and large quantities of grapes, peaches, melons, pears and other fruits are exported, as also vegetables, and especially early potatoes for the London market. Cows of the famous Jersey or Alderney breed are reared and exported in great numbers. The lower class speak a sort of old Norman French dialect, while French is the language of the upper classes and the law courts. Jersey has its own legislature, known as the 'States.' Appeals lie to the king in council. The island is attached to the diocese of Winchester. Principal town, St. Helier. Pop. 52,796. See *Channel Islands*.

Jersey City, a city, capital of Hudson county, New Jersey, opposite New York, from which it is divided by the Hudson River and with which it is connected by ferries and tunnels. It is laid out in broad streets. The manufacturing establishments are very numerous, and comprise glass works, boiler works, foundries, steel works, breweries, sugar refineries, chemical works, watch works, tobacco works, potteries, etc. The abattoir here, in which cattle and sheep are killed for the New York market, is one of the largest and best appointed in the United States. Its population is largely made up of the overflow of New York. Pop. 267,779.

Jersey Shore, a borough of Lycoming county, Pennsylvania, 12 miles w. s. w. of Williamsport. It has railroad shops, a foundry, cigar factories, etc. Pop. 5381.

Jerusalem (je-rö'sa-lem; Ar. *El-Kuds*, 'The Holy'), one of the most ancient and interesting cities in the world, in Palestine, in the Turkish province of Syria. It stands on an elevated site (about 2500 feet above the sea) within the fork of two ravines, the Valley of Jehoshaphat on the east, and the Valley of Hinnom on the south and west, while a third ravine or valley—the Tyropœon—partially traverses it from south to north. On the east side of this valley is Mount Moriah, now the Mohammedan quarter of the city, where anciently stood the palace and temple of Solomon. Immediately south of this stood the mountain fortress of Zion, known as the City of David, and later as the Akra, or Lower City. This part of the city is now waste. According to another view, however, the 'City of David' is the Upper City on the opposite or western side of the Tyropœon Valley, and to this the name of Zion is given by current tradition. This part is where the quarter of the Armenians, the citadel, and the Protestant church now are. Of the three walls which Jerusalem eventually possessed, the first wall, that of David, was for the defense of this Upper City (the traditional, but probably not the ancient Zion). The second wall took in a considerable area on the east and northeast, while a new town or suburb, Bezetha, which grew up on the north of this, was enclosed by a third wall, built by Agrippa I. The present limits are much the same

as those indicated by the third wall, only that the old Lower City and the southern part of the old Upper City are unpopulated places outside the modern walls. Of the seven gates only five are now used. The interior of the city is much occupied by mosques, churches and convents. The houses are substantially built of stone, and present in most cases no windows to streets, which accordingly—generally narrow, ill-paved and sloping to the center—are merely long lanes with dead walls on each side of them. In the northwest quarter is the Church of the Holy Sepulcher, so called because alleged to contain under its roof the very grave in which the Saviour lay. This church, which was built by Helena, the mother of Constantine the Great, is remarkable for the richness of its decorations and the number of pilgrims by whom it is visited. A large area in the east of the city is occupied by the enclosures known as El Haram-Esh-Sherif ('The Noble Sanctuary'), which is in the form of a regular parallelogram surrounded on all sides by a lofty wall. The most conspicuous building within is the Mosque of Omar, called also Kubbet-es-Sakhrah ('Dome of the Rock'), a splendid structure of octagonal form which occupies the site of the Jewish Temple. Among the notable convents are the Latin convent, and the still more extensive Armenian convent capable of accommodating 1000 pilgrims. Within the last twenty years or so a considerable improvement has taken place in the appearance of the city as well as of the surrounding country. Among the rest, hotels in which all modern conveniences and comforts may be enjoyed have been erected for the hosts of pilgrims and travelers who annually visit the place.

A Street in Jerusalem.

The population is given as about 60,000, of whom about two-thirds are Jews. Of the remainder about two-thirds are Christians and one-third Mohammedans. The first railway to Jerusalem was opened in 1893.

Jerusalem is not mentioned by name till about B.C. 1500, when it was in the hands of the Jebusites. The lower part was wrested from them by Joshua, but the upper part continued in their possession till the time of David, who took up his residence in the stronghold of Zion, and made Jerusalem the capital of his kingdom. It reached the height of its glory under Solomon, after whose time it declined. In 586 Nebuchadnezzar took and destroyed the city after a long siege, and carried off those of the inhabitants whom the sword had spared as captives to Babylon. On the return from the captivity the temple was rebuilt, B.C. 515. The walls were not rebuilt till the time of Ezra and Nehemiah, 455 B.C. The city had regained a considerable degree of prosperity, when it was sacked and its walls leveled by Antiochus of Syria in 168. Under the Maccabees Jerusalem, in common with Judea, became once more independent, 165 B.C. It next became tributary to Rome, and had been greatly beautified and enriched with a fine new temple by Herod when the Saviour appeared. In A.D. 36 Jerusalem was taken by a party of Jews who had revolted against Rome. Titus, the son of the emperor Vespasian, regained it in the year 70, after a terrible siege; the temple was burned, and the city razed to the ground. In 131 Hadrian ordered the city to be rebuilt, but it continued depressed till the beginning of the fourth century, when, Rome having become Christian, Jerusalem shared in the bene-

fit, and assumed the appearance of a distinguished Christian city, under the fostering care of Helena, mother of Constantine the Great. This period of prosperity, prolonged by a succession of Christian emperors, was suddenly terminated in 636, by the conquest of the Mohammedans, under the Arabian Caliph Omar. In 1099 the Crusaders took Jerusalem by storm, and made it the capital of a Christian monarchy, which with difficulty maintained its existence till 1187, when it was finally overthrown by Saladin. In 1517 Jerusalem fell into the hands of the Turks, and has remained to this day a part of the Ottoman empire.

Jerusalem Artichoke. See *Artichoke.*

Jerusalem Cherry, a name given to two shrubs of the genus *Solānum* (potato genus) cultivated as ornamental plants.

Jervis, Sir John. See *Vincent, Earl of St.*

Jesi (yā'sē), a town in Italy. See *Iesi.*

Jessamine. See *Jasmine.*

Jesso, an island of Japan. See *Yesso.*

Jessulmeer, or Jeysulmeer. See *Jaisalmer.*

Jester (jes'tėr), or Court Fool, a buffoon or person maintained by the noble and wealthy to make sport by jests and merry conceits for them and their friends. The professional jesters usually wore a motley or parti-colored dress, and a cap or cowl of gay colors furnished with bells and asses' ears, or crowned with a cock's comb. In Britain the last jester regularly attached to the royal household seems to have been Archie Armstrong, the jester of James I and Charles I.

Jester.—Antiquarian Club.

Jesuit Porcelain, a name given to Japanese porcelain of the sixteenth century, which the Jesuits had caused to be decorated with Madonnas, images of the saints, and Christian emblems. It is now rare.

Jesuits (jes'ū-itz), or Society of Jesus, the most celebrated of all the Roman Catholic religious orders, founded in the sixteenth century by Ignatius Loyola, and established by a papal bull in 1540, the founder being the first *general* of the order. The members, in addition to the usual vows of poverty, chastity and implicit obedience to their superiors, were bound by a fourth, viz., to go whithersoever the pope should send them, as missionaries for the conversion of infidels and heretics, or for the service of the church in any other way. The popes Paul III and Julius III, seeing what a support they might have in the Jesuits against the Reformation, granted to them privileges such as no body of men in the church or state had ever before obtained. They were permitted to enjoy all the rights of the mendicant and secular orders; to be exempt from all episcopal and civil jurisdiction and taxes, so that they acknowledged no authority but that of the pope and the superiors of their order; to exercise every priestly function, parochial rights notwithstanding, among all classes of men, even during an interdict; and they could absolve from all sins and ecclesiastical penalties, dispense themselves from the observance of fasts and probation of meats, and even from the use of the breviary. Their general was invested with unlimited power over the members, the dispersion of whom throughout society, with the most entire union and subordination, was made the basis of the order. The constitution of the body was drawn up in great part by Loyola himself, but the second general, Laynez, had much to do in directing its early movements.

The order soon approved itself to the pope by its zealous activity, and its success as the most effectual barrier against the growing power of Protestantism. The Jesuits carefully avoided all appearance of spiritual pride, often wore the ordinary garb of the country, and generally dealt with all matters in a spirit of worldly policy and accommodation to circumstances. Their grand object was the establishment of the papal power, not only against Protestantism, but against all the claims of kings and national churches. In 1541 their foreign missions were begun by Francis Xavier in the Portuguese East Indies, and were attended with great success. Other Jesuits went to South America, and labored successfully in Brazil and Paraguay. In Europe they became the teachers of the higher classes, and introduced on a grand scale improvements in the current system of instruction. The young

nobility were almost exclusively sent to them, and even from Protestant countries. It was in Catholic countries, however, that their strength lay; in England and the Protestant states of the north they were not so successful, their repeated attempts to establish themselves there proving fruitless.

Yet notwithstanding the great favor which they enjoyed at courts and among the people, the non-Jesuit clergy, the older orders of monks, the universities, and the learned men of the age soon began to dread the powerful influence which the society was rapidly acquiring, while their pro-papal spirit made them the objects of suspicion and jealousy to statesmen, on account of their opposition to Gallican principles. For this reason the parliament and higher clergy of France for twenty years resolutely resisted the attempts of the Jesuits to gain a footing in that country. It was owing chiefly to the favor of the Guises that they at last, in 1562, were legally recognized in France under the name of *Fathers of the College of Clermont*, with a humiliating renunciation of their most important privileges. They appeared in Germany about 1549, and soon secured chairs in the universities of Prague, Ingolstadt, Cologne, Munich, Treves, Augsburg, and other places. They showed remarkable political talent in the thirty years' war, in which the league of the Catholics could do nothing without them. But while they were thus successful in this part of Europe, in France and the Netherlands the Jansenist controversy injured their position, and the character of the Jesuits received a fatal wound from the pen of Pascal, whose famous *Provincial Letters*, written with admirable wit and argument, unduly exaggerated the dangerous element of their doctrines and practices, and the accommodating morality which allowed interest and external circumstances to determine the rule of conduct, which, according to his false assertion, counseled evasiveness and mental reservation.

Towards the middle of the eighteenth century a general hostile movement against the Jesuits, alleging incompatibility of their privileges with the rights of others, prompted a powerful movement against them in various countries. In 1759 the efforts of the minister Pombal brought about their expulsion from Portugal, and the confiscation of their possessions in that country. In France the commercial complications of a Jesuit trading-house at Martinique with some French merchants led to an inquiry, which involved them financially. Louis XV tried to save the society by demanding a reform of its constitution, a demand refused by the general of the order, Lorenzo Ricci, in the famous terms, *Sint ut sunt, aut non sint* ('Let them be as they are, or cease to be'). The result was a decree issued in 1764 for the abolition of the order in all the French possessions. Three years later they were expelled from Spain and soon after from Naples, Parma and Malta; and finally in 1773 Pope Clement XIV was induced to publish his famous bull *Dominus ac Redemptor Noster*, by which the Society of Jesus was temporarily suppressed in most countries. They were then obliged to quit their houses, lay aside the garb of the order, renounce all intercourse with one another, and either enter some of the other orders or put themselves under the superintendence of the bishops. They received annuities from the revenues of their confiscated estates, except in Portugal, in which country they were prohibited from residing, as also in Spain; while in the States of the Church, in Upper Italy and in Germany, Hungary, Poland and even in France they were suffered to remain as private persons. An attempt in 1787 to revive the society under the name of *Vincentines* was unsuccessful; but in 1814 Pius VII issued a bull (*Solicitudo omnium Ecclesiarum*), which reëstablished it in almost the same form from which it had fallen. In 1815 a college was given them at Modena, and they did not delay to accept the invitations of the kings of Sardinia, Naples and Spain. Subsequently they found entrance into all European countries. In Italy, since the establishment of the new kingdom, in 1861, the Jesuits have had no legal existence, but continue, nevertheless, an influential and well-known body. In Britain they have been permitted to open several educational institutions. In Ireland also they have a number of important institutions, and, within a recent period, in Scotland. They have also colleges in the United States and in Canada. Their enemies assert it was through them that the Œcumenical Council of 1870 was held, and that they have had a decided influence in shaping the recent policy of the papal authorities. By the law of July 4, 1872, they were expelled from the German Empire, and they were expelled from Portugal after the revolution of 1910. In 1880 they were expelled from their conventual establishments in France, and a considerable number of them went to Britain. Despite all the opposition to them the Jesuits have now in the world more than 200

colleges and 50,000 students, while their priests number nearly 7000.

Jesuits' Bark, or PERUVIAN BARK, the bark of a certain species of *Cinchona*, so called because it was first introduced into Europe by the Jesuits. See *Cinchona*.

Jesuits' Nut, a name sometimes given to the fruit of the *Trapa natans*. See *Trapa*.

Jesus (jē'zus), son of Sirach, the author of the apocryphal book called *Ecclesiasticus* (which see).

Jesus Christ (*Iēsous*, the Greek form of Joshua or Jeshua, contracted from Jehoshua, meaning, help of Jehovah, or Saviour; *Christos*, the Greek translation of the Hebrew Messiah, anointed), the founder of the Christian religion; born in Bethlehem, according to the received chronology in the year of Rome 754, but in reality some four years earlier, that is, in 4 B.C. He was born of the Virgin Mary, of the tribe of Judah, who was betrothed to Joseph, by occupation a carpenter. Two genealogies of Joseph, differing very much after the time of David, are given, one by Matthew, chap. i; the other by Luke, chap. iv. Our information concerning him is derived almost entirely from the accounts of his life written by the four evangelists, Matthew, Mark, Luke and John, and incidental notices in other parts of the New Testament. Before the birth of the Holy Child, Joseph and Mary, then residing in Nazareth, went to Bethlehem to be taxed, and it was there, in a manger, the inn being full, that Jesus was born. On the night of his birth an angel announced the coming of a Saviour to shepherds tending their flocks by night in the field. On the eighth day he was circumcised according to the law of Moses. Soon after his birth he was hailed by the adoration of the Magi or wise men of the East, who were miraculously directed to the house where the young child was, and presented royal gifts. Herod, alarmed at hearing of the birth of one who was to be King of the Jews determined to destroy all the male children of Bethlehem and its vicinity of the age of less than two years, for the purpose of effecting the death of Jesus. But Joseph, being miraculously warned of the danger, fled to Egypt with the Virgin and her child, and on his return, after the death of Herod, went to reside at Nazareth in Galilee, whence Jesus was often called a Nazarene. We have no further accounts of Jesus till his twelfth year, when his parents took him with them to Jerusalem. Here after being lost for three days he was found in the temple sitting among the doctors, hearing them and asking them questions. Regarding the following eighteen years of his life the evangelists are silent. He is supposed during this period to have followed his father's occupation, that of carpenter. At the age of about thirty he appeared as a public teacher, having been baptized in the Jordan by John, who recognized him as the Messiah. He then retired to the wilderness, where he passed forty days in fasting, meditation and prayer previous to being tempted of the devil, as described by the evangelists. He then began to select his disciples, to teach publicly, and perform miracles. Among the notable incidents of his public career, as narrated by the evangelists, are, the changing of the water into wine at the marriage in Cana of Galilee (his first miracle); the driving of the traders out of the temple during the feast of the passover; the curing by a word of a nobleman's son lying ill at Capernaum; his scornful reception as a preacher in the city of Nazareth on account of his humble parentage; the calling of the twelve apostles; the sermon on the mount; the healing of the centurion's servant and the restoration of the widow's son at Nain to life; the healing of the man at the pool of Bethesda; the miraculous feeding of 5000 persons with five loaves and two fishes; the calming of the tempest on the lake of Gennesaret; his healing the Syrophenician woman's daughter of an unclean spirit; the transfiguration on the mountain; the raising of Lazarus at Bethany; the cure of blind Bartimæus at Jericho; the entry with triumph into Jerusalem; the fourth feast of the passover with his disciples, known as the Last Supper; the agony in the garden of Gethsemane; the betrayal and the condemnation before the sanhedrim; the trial before Pilate, and the crucifixion on Golgotha or Mount Calvary. The body of Jesus was taken down from the cross by Joseph of Arimathea, and placed in a tomb about which the Jewish priests set a guard. But on the third day, *i. e.* on the day thence called the Lord's day and made the first day of the week, he rose from the dead, appeared to his disciples and others, and on the fortieth day after his resurrection, while with his disciples on the Mount of Olives, was visibly taken up into heaven. These events of his public life are generally considered to have occupied three years.

Jesus College, Cambridge, an institution founded by Alcock, bishop of Ely, in 1496.

Jesus College, Oxford, was founded by Queen Elizabeth in

1571. Many of the fellowships and scholarships are confined to persons born or educated in Wales. The college is thus distinctively a Welsh one. This was the first college founded on Protestant principles.

Jet, a solid, dry, black, inflammable fossil substance, harder than asphalt, susceptible of a good polish, and glossy in its fracture, which is conchoidal or undulating. The finest quality and chief supply of it is found at Whitby, England, in beds of the Upper Lias shale. Spain also supplies fine jet, and much is obtained in France. It is the altered fossilized wood of coniferous trees, being a peculiar form of lignite. It is wrought into buttons and personal ornaments of various kinds.

Jetsam (jet'sam), or JETTISON, goods thrown overboard from a ship in danger. See *Flotsam*.

Jette, or JETEE (jet-tē'), the fiber of *Marsdenia tenacissima*, a small climbing plant of the nat. order Asclepiadaceæ, growing in some elevated regions of North India. The fiber is fine and silky and of great strength.

Jetty (jet'i), a kind of pier or artificial projection of stone, brick, wood, or other material, affording a convenient place for landing from and discharging vessels or boats, or serving as a protection from the violence of the waves; or a jetty may be built out from the bank of a stream obliquely to its course, and employed either to direct a current on an obstruction to be removed, as a bed of sand or gravel, or to deflect it from the bank which it tends to undermine or otherwise injure. In this last sense jetties have been successfully used to deepen river mouths or retard the advance of a bar, as at the mouths of the Mississippi, the Columbia, the Maas, the Danube, the Vistula, and other rivers. The jetties at Galveston harbor, Texas, extend about 6½ miles from the island to the outer bar, and are the longest in the world. The Mississippi jetties are composed of brash, woven into wooden frames. Flimsy as they seem, they have been very durable and successful in deepening the channel. Many harbors, such as Calais, Ostend, etc., depend on jetties for their existence.

Jeux Floraux (*zheu* flō-rō; Floral Games), a poetic contest and festival annually celebrated in Toulouse, and having its origin in a poetical college, Collége du gai Savoir, founded in 1323 by seven troubadours. Its annual fête is still celebrated, and a volume of the competition pieces is published yearly.

Jevons (jev'ons), WILLIAM STANLEY, an English writer on logic and political economy, born at Liverpool in 1835. He was educated at University College, London; held an appointment in the royal mint in Australia from 1854 to 1859; was graduated at London University in 1862; was appointed professor of logic, mental and moral philosophy, and Cobden lecturer on political economy in Owens College, Manchester, afterwards professor of political economy in University College, London, a post which he resigned in 1881. Among his works are *Elementary Treatise on Logic* (1870), *Theory of Political Economy* (1871), *Principles of Science* (1874), and many essays and addresses on economic questions. Those entitled the *Coal Question*, the *Value of Gold*, *Money* and the *Mechanism of Exchange*, may be specially mentioned. He was drowned while bathing in 1882.

Jew (jö), THE WANDERING, a legendary personage, regarding whom there are several traditions. One of the most common is that he was a cobbler in Jerusalem by name Ahasuerus, at whose house Jesus, overcome with the weight of the cross, stopped to rest, but who drove him away with curses. Jesus is said to have replied, 'Truly, I go away and that quickly; but tarry thou till I come.' Since then, driven by fear and remorse, the Jew has wandered, according to the command of the Lord, from place to place, and has never yet been able to find a grave. The legend has been made use of by Shelley, Lewis, Croly and Mrs. Norton in England, Schubart and Schlegel in Germany, and Sue in France.

Jew-bush, *Pedilanthus tithymaloides*, a plant of the nat. order Euphorbiaceæ. It grows in the West Indies, and is used in decoction as an antisyphilitic, and in cases of suppression of the menses. It is also called *Milk-plant*.

Jewell (jö'el), JOHN, Bishop of Salisbury, born in 1522; died in 1571. He was educated at Oxford, embraced the principles of the Reformation, and contributed greatly both by his work as a college tutor and by his sermons and writings to the progress of Protestantism. On the accession of Mary he at first temporized to avoid persecution, but finally in 1554 escaped to Frankfort. On the accession of Elizabeth in 1558 he returned to England, took part in all the measures for the thorough establishment of Protestantism, and became Bishop of Salisbury in 1560. He is famous for his many controversial writ-

ings, among which his *Defence of the Church of England*, or *Apologia Ecclesiæ* (1562), written in elegant Latin, is notable.

Jew-fish, the name given to two species of large fishes well known in American waters. The one known also as the guasa or black grouper (*Promierops itaira*) sometimes reaches the weight of seven hundred pounds; the other (*Stereolĕpis gigas*) inhabits particularly the Californian coast, often weighs five hundred pounds, and has flesh of excellent quality.

Jewish Era. See *Epoch* and *Calendar.*

Jews (jös), a Semitic race of people also known as Hebrews and Israelites, and whose early history is identified with that of Palestine or the Holy Land. The main authority for the early history of this people is the Old Testament. But the chronology is obscure and difficult to harmonize. Jewish history may be considered as beginning with the emigration of the patriarch Abraham, ancestor of the race, from Ur of the Chaldees, probably about 2000 B.C. Abraham removed to the southeast of Palestine, where we find his descendants flourishing when they were led to emigrate to Goshen, in Egypt. The interval is filled up with the history of the patriarchs, Abraham, Isaac and Jacob (which see). Joseph, a son of Jacob, had become viceroy of Egypt, and his father and brothers were received with high favor by the Pharaoh who then ruled in this country. But in course of time the condition of the Israelites, under the rule of the Pharaohs, changed for the worse. They were treated as bondmen, and forced labor was exacted of them in an unreasonable degree. According to some authorities the Pharaoh who began to oppress the Israelites was Rameses II, and their deliverance took place under his son. (See *Egypt.*) It was perhaps about 1320 B.C., others say 1491 B.C., that a deliverer in the person of Moses led the Israelites out of the land of bondage, where they had resided for some 400 years. By this time they formed a large community, divided into twelve tribes, named respectively after Reuben, Simeon, Judah, Issachar, Zebulun, Benjamin, Dan, Naphtali, Gad and Asher, sons of Jacob, and Manasseh and Ephraim, sons of Joseph. Under the leadership of Moses they went into the wilderness, and through him received the law of the Ten Commandments on Mount Sinai and the whole policy by which they were to be governed as a people. A ceremonial of sacrifice was instituted, and Aaron, the elder brother of Moses, and his sons consecrated as a hereditary priesthood, the priestly functions thus falling to the tribe of Levi. The nation was established as a theocracy, and this principle, however, often forgotten in times of repose, continued henceforward to be the inspiring idea of national unity throughout the frequent crises of Jewish history. The emigrants first settled at Kadesh on the southern borders of Palestine, where they remained for many years, this being the period spoken of in the Scriptures as the forty years' wandering in the wilderness. They now marched northward to find new settlements in Palestine, which they had to wrest by force from the Canaanites. Moses died before entering the promised land, and was succeeded as leader by Joshua, under whom the Israelites advanced to the conquest of the territories of the Canaanites west of Jordan. The former inhabitants, however, were not entirely subjugated, but retained possession of a number of cities, and the twelve tribes settled in districts which were more or less cut off from one another, and which formed an exceedingly loose union of small states under the tribal chiefs, at times hard pressed by neighboring peoples. It was only long after, and by a gradual process of absorption, that the Canaanite territories and their inhabitants became amalgamated with the Israelites.

After the death of Joshua, about 1220, or according to another chronology 1427 B.C., a succession of judges or military leaders arose. Among the more remarkable of these judges were Barak, Deborah the prophetess, Gideon, Jephthah, Samson and Samuel. About 1070 the Philistines, who inhabited the coast and the low-lying plains west of the mountains of Judah, had defeated the Israelites and subjugated part of the country when Samuel, the 'last judge in Israel,' was inspired to declare to Saul, a Benjamite, his destiny to become king, and anointed him as such. Saul soon proved his fitness for the post by his successful leadership of the Israelites, and he continued to organize the forces of Israel, and to fight with varying success against their enemies till his disastrous defeat and death at Mount Gilboa, after which the power of the Philistines again predominated on the west side of Jordan. On the other side of the river the military skill of Abner still preserved a kingdom for Saul's son, Ishbosheth, and gradually reasserted with some success his authority in Ephraim and Benjamin. But in Judah David, a native of Bethlehem, a warrior whom Saul's jealousy had driven into exile and alliance with the Philistines,

and who had previously been anointed king in place of Saul, established a separate principality, the capital of which was at Hebron. For seven years a hot war was waged between the two Hebrew states, and ended only with the murder of Abner and Ishbosheth, when all the tribes acknowledged David as King. David now transferred his residence from Hebron to Jebus, a fortified city which he wrested from the Canaanites, and called the city of David, afterwards Jerusalem. He assailed and subdued the Philistines, Moabites, Edomites, Ammonites, and other surrounding nations, till all the country from the N. E. end of the Red Sea to Damascus acknowledged his authority. To this prosperous kingdom succeeded his son Solomon (B.C. 993, or by the long chronology 1015). His reign, owing to the warlike reputation which the nation had acquired under David, was entirely peaceful. He had no military tendencies, but he took great pains to arrange the administration of the kingdom in an orderly way, and his wisdom as a ruler and judge became proverbial. His alliances with Tyre and Egypt enabled him to carry on an extensive and lucrative commerce. He built the celebrated temple in Jerusalem, and extended and improved the city. His harem contained 700 wives, spoken of as princesses, besides 300 concubines. But with these, and with the extended commerce of the kingdom, it was inevitable that foreign elements should be introduced into the Jewish national life. Thus Solomon erected altars for the deities and the worship of the Moabites, the Ammonites, the Sidonians and other nations; and the severe simplicity of old Hebrew manners gave place to luxury and craft.

The splendor of Solomon's reign had entailed heavy exactions upon his people. When Rehoboam, Solomon's son, succeeded, they came with Jeroboam at their head and demanded that he should make their yoke lighter. Rehoboam answered scornfully, whereupon ten tribes revolted and set up Jeroboam as king of a separate kingdom of Israel, with its capital first at Sichem, later at Samaria. Judah, along with a part of Benjamin and the tribe of the Levites, remained loyal to the dynasty of David. After an unsuccessful attempt to reconquer the kingdom of Israel, Rehoboam was forced by an invasion of Shishak of Egypt to give up the hope of uniting the two kingdoms. In the next generation things had changed so much that Asa, king of Judah, was obliged to seek the help of Benhadad of Syria against King Baasha of Israel. Baasha was succeeded by Elah, Elah by Zimri and Zimri by Omri, under whom the kingdom of Israel seems to have grown powerful. Omri established the capital of the kingdom at Samaria (about 906 B.C.), and subjugated the Moabites. The son of Omri, Ahab, married Jezebel, princess of Tyre, an event which led to the extension of Phœnician idolatry in Israel. As Solomon had done before, Ahab built a temple for the Syrian Baal in his capital. In his reign and subsequently the great prophets Elijah and Elisha played an important part. Ahab was slain at Ramoth-Gilead in battle against the Syrians. He was succeeded by Ahaziah (853-851), and Joram (851-843). The latter was slain by Jehu, a captain of the army, who had been anointed king by command of Elisha. Jehu (843-815) now made a clearance in Samaria of Syrian idolatries, destroying the temple of Baal and putting the priests to death. Under Jeroboam II, fourth in the line of Jehu, the kingdom reached a high point of prosperity (790-749). After Jeroboam's death there was a quick succession of kings, Zachariah, Shallum, Menahem, Pekahiah, Pekah; none of any significance. Under Pekah the kingdom of Israel became tributary to the Assyrians. (See *Assyria.*) Hosea, Pekah's successor, made an ineffectual attempt to free the country from the Assyrian yoke; but finally, in 722, Samaria was captured by the Assyrian king, Sargon, the kingdom of Israel virtually destroyed, and the chief inhabitants carried away and settled in Assyria and Media.

Generally, while the kingdom of Israel had been flourishing, that of Judah had stood in the background. Rehoboam was succeeded by Abijam, Asa, Jehoshaphat, the last a powerful and fortunate king. In the hope of putting an end to the war with the kingdom of Israel, Jehoshaphat married his son Jehoram (848-844) to Athaliah, the daughter of Ahab of Israel. After the murder of her son Ahaziah by Jehu, Athaliah seized the supreme power in Jerusalem, and put to death her own grandchildren in order to destroy the line of David, Joash alone being miraculously rescued. Athaliah was overthrown and put to death and the young Joash raised to the throne (837-797). His successors were: Amaziah (797-792), Uzziah (792-740), Jotham, Ahaz and Hezekiah (727-699). Under Ahaz and Hezekiah Isaiah delivered his sublime prophecies. Hezekiah was one of the greatest reforming kings; his influence extended widely over the kingdom of Israel, now in extreme decline. He was miraculously delivered from an invasion of Sennacherib, king of

Assyria, by the destruction of the Assyrian army. (See *Assyria.*) Josiah (641-610 was the last of the pious kings of Judah. He was killed in battle against Necho, king of Egypt. After him there was an uninterrupted succession of weak and incapable monarchs, till under Zedekiah (599-588) the capture of Jerusalem by Nebuchadnezzar, B.C. 588, put an end to the monarchy, Jerusalem being destroyed and many of the people being carried captive to Babylon. The prophet Jeremiah flourished from the reign of Josiah to the captivity.

In 538 Babylon was taken by Cyrus, king of Persia, who restored the Jews and appointed Zerubbabel governor of Judæa, as a Persian province. The great majority of the Jews remained in Persia, however, only about 42,000 returning and settling chiefly in the vicinity of Jerusalem. About 458 a second return of exiles was led from Persia by Ezra. Along with Nehemiah, who had been appointed Persian governor of Judæa, Ezra promulgated the new law-book, practically identical with the *Pentatcuch.* From the time of Nehemiah to the fall of the Persian empire the Jews continued to live in peace as Persian subjects, but enjoying their own institutions. When Alexander the Great overthrew the Persian empire the Jews readily submitted on being promised the free exercise of their religion (B.C. 332). After the division of Alexander's empire Palestine was long a possession of the Ptolemies of Egypt, under whom it enjoyed a period of tranquillity. It was under the patronage of Ptolemy Philadelphus (reigned B.C. 285-247), according to tradition, that the Septuagint or Greek version of the Old Testament Scriptures was made. After the death of Ptolemy Philopator Antiochus the Great of Syria became master of Palestine (B.C. 198). An Egyptian and a Syrian party now arose among the Jews, and gave occasion to civil dissensions, which led Antiochus IV (Epiphanes) to invade Judea (B.C. 170). when he took Jerusalem by storm and slaughtered the inhabitants without distinction of age or sex, and endeavored to compel the Jews to give up their religion. At length, under the leadership of the Maccabees or Asmonæan family, resistance arose, and after a struggle of nearly fourteen years was successful. In 135 B.C. John Hyrcanus, son of Simon, a brother of Judas Maccabæus, completed the independence of Judæa, and extended his dominion over the ancient limits of the Holy Land. During his reign the rival sects of the Pharisees and Sadducees became established. Aristobulus I, the son of Hyrcanus, assumed the title of king, which was held by his successors. In B.C. 63 Pompey, called in to help the Pharisees, took Jerusalem, and made the Jews tributary to the Romans. Subsequently Herod the Great, who entirely threw off the Jewish manners and cultivated the favor of the Romans, was recognized as King of Judæa by the Roman senate. It was B.C. 4, the last year of his reign, that the birth of Christ took place at Bethlehem. In 6 A.D. Judæa and Samaria became a Roman province under a procurator, who had his seat at Cæsarea, and was subordinate to the prefect of Syria. Pontius Pilate, under whom our Lord's public ministry and crucifixion occurred, was made procurator A.D. 26. For a time the country was again ruled by a king, Herod Agrippa, A.D. 41-44 He persecuted the Christians and put the Apostle James to death. In A.D. 65 a party of the Jews revolted from the Roman yoke and roused the whole of Palestine to insurrection. Vespasian was sent by Nero to suppress it, but before the war was finished he was called to the empire and left his son Titus to conclude it. The result was the capture and destruction of Jerusalem, A.D. 70, an event that deprived the Jews of the center of unity to which their national life had hitherto clung. After an insurrection headed by Bar-Cochba, 132-135, Hadrian completely razed to the ground the remains of Jerusalem left by Titus, and erected in their place a Gentile city, with the title Ælia Capitolina. Jews were then forbidden to enter this city on pain of death, and the name of Jerusalem was not revived for it till the time of Constantine. See *Jerusalem.*

Thenceforth the Jews became more and more a scattered people, without a country they could call their own. Under the Roman emperors their treatment varied. Under the Emperor Julian they ventured to make preparations for a new temple in Jerusalem. Although this attempt failed, they derived great advantages from their patriarchates (presidencies of the sanhedrim), which were established—one at Tiberias for the Western Jews (429) ; the other for the Jews beyond the Euphrates, latterly at Bagdad. These two patriarchates became points of union, and flourishing Jewish academies arose in the East to serve as seminaries for their learned rabbis. One of the works of these scholars was the collection of the traditionary expositions of the Old Testament, and additions to it, which was completed A.D. 500, and received, under the name of the *Talmud,* as a rule of

faith by the scattered communities of Jews. (See *Talmud.*) In time the scattered Jews made themselves masters of the commerce of the Old World, and, as money-lenders and brokers, were often of great importance to princes and nobles. Even during the dreadful persecutions which they underwent from the cruelty of the Christians they still continued prosperous in Christian countries. They lived more happily, however, among the Mohammedans, although they were distinguished by dishonorable badges and oppressed by heavy taxes; and during the Moorish supremacy in Spain their prosperity was great and their learning flourishing. In the cities of France, Germany and Italy, after the eleventh century, particular streets and inclosed places were assigned to them as a sort of outcasts, in consequence of which, in the persecutions during the Crusades, thousands often fell victims at once to the popular fury. They were generally pronounced incapable of civil rights and public offices. In Spain and Portugal during the fifteenth century they yielded to force, and multitudes suffered themselves to be baptized, many were put to death by the Inquisition, and at last they were banished from the peninsula. It was only in the end of the last century that the Jews began to be put on a level with other citizens, France leading the way after the Revolution, and Prussia, following (1811). After repeated unsuccessful attempts to procure their admission into the British Parliament the object was at last effected in 1858. The Jews are still oppressed in Russia, in which country they are very numerous and have been subjected to several recent massacres. The most remarkable circumstances connected with the modern Jews is the tenacity with which they cling to their ancient religion, and the purity in which on the whole they have retained their racial characteristics in the midst of alien peoples. In modern times they have produced some of the greatest names in letters and arts, as Spinoza, Moses Mendelssohn, Heinrich Heine, Meyerbeer, etc., and have displayed remarkable ability in business. The total number of Jews throughout the world is estimated at 8,000,000, the greater number being in Russia and Austria-Hungary. For the national language and literature of the Jews see *Hebrew Language and Literature.*

Jews'-harp, a toy musical instrument held between the teeth, which gives a sound by the motion of a tongue of steel, which, being struck by the hand, vibrates against the breath. Called also *Jews' Trump,* or simply *Trump.*

Jeypore. See *Jaipur.*

Jezreel (jez'rēl), a city of Palestine, chosen by Ahab, king of Israel, as his chief residence.

Jezreelites (jez'rēl-īts), a religious sect founded by James Jershom Jezreel, his real name being James White, who died in 1885. The revelations which he pretended to have received were contained in *The Flying Roll,* which represent the Jezreelites as being animated by the just spirits who withstood Satan at his rebellion in heaven, and who shall enjoy a greater state of bliss than Gentile Christians, who have the spirits which, though not rebellious, did not actively withstand Satan. The headquarters of the sect are at Gillingham, Kent.

Jhálawár (jä'lä-wär), an Indian native State in Rájputána; area, 2694 sq. miles; pop. 340,488. Capital, Jhaira Pátan, or Pátan; pop. 23,000.

Jhang (jung), a town of Hindustan, in the Punjab, about 3 miles from the Chenab. Pop. (with adjoining Maghiana) (1901) 24,382.—Jhang district has an area of 5702 sq. miles; pop. 378,695.

Jhansi (jhän'sē), a fortified town in Hindustan, in Gwalior state, Central India Agency; pleasantly situated amid tanks and groves of fine timber trees. Within the town stands the fort on a rock. Pop. 55,724.

Jhelum (jhā'lam), JHILAM (jhē'lam) (anciently *Hydaspes*), a river of India, the most westerly of the five great rivers that intersect the Punjab. It rises in Cashmere, flows south, forming the boundary between Cashmere and the Punjab, then southwest through the Punjab, and finally falls into the Chenab. Its whole course is about 450 miles, and it is navigable for the flat-bottomed boats of the country from its junction with the Chenab up nearly to its emergence from the mountains.—There is a town of same name on the right bank of the river, with military cantonments. Pop. 21,107.

Jib, a triangular fore-and-aft sail extended on a stay stretching from a bowsprit or jib-boom to a mast, the *jib-boom* being a continuation of the bowsprit by a spar run out from the extremity of it.

Jiddah (jid'da), or JEDDAH, one of the chief trading ports of Arabia, on the Red Sea, 60 miles west of Mecca, of which it is the port. It has a considerable trade, and thousands of

pilgrims arrive here annually on the way to Mecca. Pop. about 30,000.

Jig, a light quick tune or air in 3-4, 3-8, 6-4, 6-8, 9-4, 9-8 or 12-8 time, to be found in the sonatas or suites of Corelli, Handel, and other composers till the middle of the eighteenth century.

Jigger (jig'gėr), CHIGOE or SAND-FLEA, a parasitic insect native to tropical America, but now found in the southern and southwestern sections of the United States. The jigger attacks man, and while the male does not differ from other fleas, the female buries the anterior part of her body in the skin and becomes enormously distended with eggs. The place of attack is usually the skin beneath the toes, so that persons who go barefoot are liable to fall victims. The treatment is the removal of the parasite, taking care to leave no eggs or young behind, as these cause extensive ulceration.

Jig-saw, cally in a frame, and worked a fine narrow saw set verti- by a treadle. It is used for cutting curved or irregular lines.

Jim-crow, an implement for bending and straightening rails. Also a metal planing-machine, with a reversing tool adapting it to plane both ways. The term originated in an old negro song, and became a typical term for a negro, from which the cars set aside for negroes in railroad trains are called Jim-crow cars.

Jimena de la Frontera (*hi*-mā'nȧ) a town of Spain, in Andalusia, 46 miles E. of Cadiz. Pop. 7549.

Jingo (jin'gō), a word of unknown derivation, supposed to be a corrupted form of Jainko, the Basque name for the Supreme Being. It was first used as a political term in the Russo-Turkish war of 1877-1878, applied to politicians who urged on Disraeli, then Prime Minister of England, the necessity of taking sides with the Turks. Since that time the word has been used in both the United States and Europe to designate one who advocates a spirited and aggressive foreign policy.

Jinn (jin), JINNEE being the singular, in Mohammedan mythology, a race of genii, angels, or demons. Some are good and obedient to the will of God; others are disobedient and malignant. They can at will become visible or invisible, or assume animal shape.

Jinrikisha, a light two-wheeled carriage, resembling a gig, drawn by one or more human runners between the shafts, universally used in Japan, and introduced into China and elsewhere.

Jitomir (jit'o-mir), or ZHITOMIR, a town of Russia, capital of the government of Volhynia, on the left bank of the Teterew, 80 miles W. of Kiev. Pop. 65,422.

Joachimsthal (yo'a-*h*ims-täl), a town of Bohemia, in a valley of the Erzgebirge, near the frontiers of Saxony, 70 miles W. N. W. of Prague. It depends chiefly on its valuable lead and silver mines. *Thaler* pieces derived their name from being first coined here. Pop. 7378.

Joan (jō'an), the female pope, according to a story long believed, but now acknowledged to be a fiction, was said to have been a native of Mainz, who, falling in love with an Englishman at Fulda, traveled with him in man's attire, studied at Athens, and visited Rome. Under the name of Johannes Anglicus she rose by her talents from the station of a notary till she was elected to the papal chair, under the name of John VIII (854 to 856, between Leo IV and Benedict III). She governed well, but having become pregnant she was delivered in a solemn procession, and died on the spot.

Joan'nina. See *Janina.*

Joan of Arc (*Jeanne d'Arc*—properly *Darc*), the Maid of Orleans, a heroine in French and English history, was born in the village of Domrémy, in Champagne, now department of the Vosges, in 1412. While she was still a young girl she began to be deeply affected by the woes of her country, much of which was conquered by the English, leaving only a small portion to the French king, Charles VII. In 1429 Orleans was being besieged by the English, and its fall would have ruined the cause of Charles. At this time Joan, who had been noted for her solitary meditations and pious enthusiasm, began, as she declared, to see visions and hear angelic voices, which ultimately called upon her to take up arms for Charles, to raise the siege of Orleans, and conduct Charles to Rheims to be crowned. At first she was regarded as insane, but eventually she found her way to the king and his councilors, and having persuaded them of her sincerity, received permission to hasten with Dunois to the deliverance of Orleans. In male dress, fully armed, she bore the sword and the sacred banner, as the signal of victory, at the head of the army. The first enterprise was successful. With 10,000 men she marched from Blois, and on April 29, 1429, entered Orleans with supplies. By bold sallies, to which she animated the be-

sieged, the English were forced from their intrenchments, and Suffolk abandoned the siege (May 8, 1429). Other successes followed; Charles entered Rheims in triumph; and at the anointing and coronation of the king, July 17, Joan stood at his side. She was wounded in the attack on Paris, where Bedford repulsed the French troops, but continued to take part in the war till May 25, 1430, when she was taken prisoner by the Burgundians, and sold to the English. She was taken to Rouen, and after a long trial, accompanied with many shameful circumstances, condemned to death by the judges as a sorceress. On submitting to the church, however, and declaring her revelations to be the work of Satan, her punishment was commuted to perpetual imprisonment. But pretexts were soon found to treat her as a relapsed criminal, and as such she was burned at Rouen, May 30, 1431, and her ashes were thrown into the Seine. She died with undaunted fortitude. Twenty-five years after, a court constituted by Pope Calixtus III to examine the charges against the Maid of Orleans, pronounced her innocent. Voltaire, in a notorious burlesque, Southey, Schiller, and others have made her the subject of their verse. Schiller's drama still remains the worthiest literary monument of her fame. Since 1875 there has been a movement toward a canonization of this remarkable woman, and this led in 1909 to her being placed among the saints of the Roman Catholic Church, a just but belated tribute to her noble character.

Job (jōb), the hero of an ancient Hebrew poem, which forms one of the books of the Old Testament. Job, an upright man, with a family of seven sons and three daughters, with large herds and numerous servants, is suddenly, with the permission of Jehovah and by the agency of Satan, deprived of his possessions and his children, and smitten with a sore disease, yet submits patiently to the divine will. Three friends come to console him, and a large part of the poem is occupied with the speeches of his friends, who attribute his misfortunes to wickedness and hypocrisy, and his replies to them, until near the close, when God himself is introduced answering Job out of a whirlwind. In the sequel Job is delivered from his calamities, lives 140 years, becomes richer than he had been before, and begets seven sons and three daughters. The design of the book seems to be to enlarge men's views of the providence of God. It was probably written between the seventh and the fifth centuries B.C., and is certainly not earlier than the time of David. The authorship of the story is unknown.

Job's Tears (*Coix lachryma*), an annual grass about a foot in height, a native of the East Indies and Japan, sometimes grown in hot-houses. The hard, round, shining seeds, from whose fanciful resemblance to tears it derives its name, are used both for ornament and as food.

Jocasta. See *Œdipus.*

Jockey Club, a club for the regulation of horse-racing.

Jodhpur (jōd-pör′), or MARWAR, a town of Hindustan, capital of the state of Jodhpur. It stands in a hollow inclosed by rocky eminences, on the highest of which is a fort, containing the Maharajah's palace, and commanding the city. The city has many handsome buildings, and is surrounded by a strong wall with seventy gates. Pop. 60,400.—The state of Jodhpur is the largest in Rajputána, having an area of 35,000 sq. miles; it is well watered by the Luni and its affluents; and though arid in many parts, raises in others good crops of wheat, barley, millet, etc. Pop. 1,935,565.

Joel (jō′el), one of the twelve minor prophets. Nothing is known of his life. He is generally supposed to have been contemporaneous with Hosea and Amos. The immediate occasion of his prophecy was a protracted drought and a visitation of locusts and other destructive vermin, but it expands in a style of high sublimity into predictions of future prosperity when the divine judgments should have purified the nation. Joel is quoted by St. Peter, Acts, ii, 16-21.

Joe Miller, the name attached to a well-known collection of jests, first published in 1739. The name belonged to a comic actor, who had then a great reputation as a wit and humorist. The real compiler, however, was a John Mottley, an obscure author who died in 1750.

Jogues (zhog), ISAAC, a Jesuit missionary in North America, a native of Orleans, France. After laboring in Michigan, he visited the Mohawks in 1642, was tortured and mutilated, but escaped. Returning in 1646, he discovered Lake George (called by him Holy Sacrament), and was again tortured and murdered by the fierce savages.

Johannesburg (jō-hän′es-bėrg), a town in Vaal colony, recognized as the central point of the gold-fields of the district stretching southwest from Pretoria to Potchefstrom, and known as the Witwatersrand. The

streets and squares of the town are well laid out, and the buildings solid and substantial. The white population is mainly English, and in 1908 numbered 95,162.

John, one of the apostles, often distinguished as *St. John the Evangelist*, the reputed author of the fourth Gospel, three epistles, and the Revelation, was the son of Zebedee and Salome, and the brother of James. Previous to his call by Jesus he was a fisherman on the Sea of Galilee, together with his father, his brother, and Simon Peter and Andrew, who were his partners. John, together with Peter and James, was admitted to a more confidential intercourse with Jesus than the other apostles, and he is repeatedly spoken of as 'the disciple whom Jesus loved.' His Gospel was written later than any of the others —according to some critics to refute particular heresies, and contains fuller details of our Lord's conversation and discourses than the other Gospels, and is also more doctrinal in character. Of the three epistles the first has much resemblance to the Gospel; but the other two were considered doubtful even by the early fathers. As to the Revelation, see *Revelation*. After the death of Jesus John continued at Jerusalem, and we afterwards find him at Samaria (Acts iii, 14-25). Tradition handed down by the fathers makes him die at Ephesus, and if he wrote the Revelation he must have been banished to Patmos. The time of his death is unknown.

John, called the *Baptist*, the forerunner of Christ, was born six months before Jesus (their mothers were cousins), of a Levitical family in Judæa. He lived an austere life, given up to solitary meditations, till A.D. 26, when he began to preach in the deserts of Judæa, announcing that the kingdom of heaven was at hand, and proclaiming himself the harbinger of the Messiah. He baptized many converts, and testified to the higher mission of Jesus at the time of his baptism in the Jordan. To gratify a vindictive woman, Herod Antipas, tetrarch of Galilee, caused him to be beheaded in prison. But for long afterwards his disciples continued to form a separate body, and are said to have established the still existing sect of Sabians or St. John Christians, in Persia, distinguished for their veneration of John the Baptist.

John, the name of twenty-three popes, among whom are the following: —JOHN I (*St. John*), pope in 523-526. Theodoric sent him to Constantinople, to induce the Emperor Justin to adopt milder measures towards the Arians, and on his returning without success Theodoric threw him into prison, where he died.—JOHN XII succeeded Pope Agapetus II in 956, when only eighteen years old. He was the first pope who changed his name on his accession to the papal dignity. His life was so licentious and disorderly that the Emperor Otho had him deposed by a council in 963, and Leo VIII elected in his stead. But on Otho's departure John returned to the city with a strong body of followers and drove out Leo. He died in 964.—JOHN XXII, a native of Cahors, was elected pope at Lyons in 1316, after the death of Clement. He resided at Avignon, and took an active part in the disputes of the emperors Louis of Bavaria and Frederick of Austria. He died in 1334.—JOHN XXIII (*Balthasar Cossa*), born in Naples, was a pirate in his youth, afterwards studied at Bologna, and was elected pope in 1410, by the Council of Pisa, after the death of Alexander V, on condition that, if Gregory XII and Benedict XIII would resign, he would also retire to end the schism. He summoned the Council of Constance, demanded by the Emperor Sigismundi, in 1415, and was deposed by this council as guilty of a long list of heinous crimes. For some years he remained in custody, but was ultimately pardoned by Pope Martin V, and made a cardinal. He died in 1419.

John, King of England, born in 1166, was the youngest son of Henry II, by Eleanor of Guienne. Being left without any particular provision, he got the name of *Sans Terre*, or Lackland; but his brother, Richard I, on his accession, conferred large possessions on him. Despite this, he tried to seize the crown during Richard's imprisonment in Austria. He obtained the crown on the death of Richard in 1199, although the French provinces of Anjou, Touraine and Maine declared for his nephew, Arthur of Brittany, who was lineally the rightful heir, then with the King of France. A war ensued, in which John recovered the revolted provinces and received homage from Arthur. In 1201 some disturbances again broke out in France, and the young Arthur, who had joined the malcontents, was captured and confined in the castle of Falaise, and afterwards in that of Rouen, and never heard of more. John was universally suspected of his nephew's death and the States of Brittany summoned him before his liege lord Philip to answer the charge of murder, and in the war which followed, John lost Normandy, Anjou, Maine and Touraine. In 1205 his great quarrel with the pope began regarding the election to the see of Canterbury, to which the pope had nominated

Stephen Langton. The result was that Innocent III laid the whole kingdom under an interdict, and in 1211 issued a bull deposing John. Philip of France was commissioned to execute the decree, and was already preparing an expedition when John made abject submission to the pope, even agreeing to hold his kingdom as a vassal of the pope (1213). John's arbitrary proceedings led to a rising of his nobles, and he was compelled to sign the Magna Charta, or Great Charter, June 15, 1215. But John did not mean to keep the agreement, and, obtaining a bull from the pope annulling the charter, he raised an army of mercenaries and commenced war. The barons, in despair, offered the crown of England to the dauphin Louis, who accordingly landed at Sandwich, May 30, 1216, and was received as lawful sovereign. The issue was still doubtful when John was taken ill and died at Newark, October, 1216, in the forty-ninth year of his age.

John II, King of France (1319-64), surnamed the *Good*, was a monarch distinguished alike for his incapacity and his misfortunes. In 1356 he was defeated and taken prisoner by the Black Prince at the battle of Poitiers, and was detained at Bordeaux and at London till released at a heavy expense to his country by the Peace of Brétigny in 1360; but on learning that his son, the Duke of Anjou, who had been left as a hostage in England, had effected his escape, he returned to London, where he died in 1364.

John III (*Sobieski*), King of Poland, son of Mark Sobieski, a Polish captain, was born at Olesko, in Galicia, in 1624, served in the French army, returned to Poland to repel the Russians in 1648, and greatly distinguished himself in several campaigns against Cossacks, Tatars and Turks, especially by his defeat of the last in the great battle of Choczim in 1673. The year after, on the death of Michael Corybut, he was chosen king. His most celebrated achievement was the relief of Vienna, besieged by a great army of Turks, whom he decisively defeated Sept. 12, 1683. His last years were disturbed by the intrigues of his own family and the anarchy of the country, which he was unable to control, and in which he foresaw its approaching downfall. He died June 17, 1696.

John, Knights of St., or Knights Hospitallers of St. John, afterwards called *Knights of Rhodes*, and finally *Knights of Malta*, were a celebrated religious order, originating in a monastery founded at Jerusalem in 1048 by some merchants from Amalfi. The monastery was dedicated to St. John the Baptist, and the monks, who were called Brothers of St. John or Hospitallers, had the duty of caring for the poor and sick, and in general of assisting pilgrims. In 1118 the order was regularly instituted as a military order, with the duty, in addition to their vows of chastity, obedience and poverty, of defending the church against infidels. The brethren were divided into three classes, knights, chaplains and serving brothers, these last having specially the duties of looking after the sick, and accompanying pilgrims. In 1291 the order was driven from Palestine by the conquests of the Saracens, and after holding Cyprus for a time they occupied Rhodes in 1309, from which they were ultimately driven by Sultan Soliman II in 1522. After that the knights retired to Candia and other places, but finally to Malta, which Charles V granted them in 1530. Here they continued to be a bulwark of Western Europe against the Turkish navies till modern times. The chief of this order, which had great possessions in almost every part of Europe, was called *Grand-master of the Holy Hospital of St. John of Jerusalem*, and *Guardian of the Army of Jesus Christ*. He was chosen by vote, and lived at Valetta, in the island of Malta. The Knights of St. John observed the rules of the order of St. Augustine. The Protestants, however, were not bound to celibacy. Every member was required to be of good family. The duty of each knight used to be to take the field at least three times against the infidels or the pirates of Barbary. In peace they wore a long black mantle and a gold cross of eight points, enameled white; in war they wore

Knight of St. John.

a red jacket or tabard, charged with a white cross. In 1798 Malta was unexpectedly attacked and taken by Bonaparte, and about the same time the extensive properties belonging to the order in various countries were confiscated. It still exists nominally.

John Bull, a collective name, used in a sportive manner in order to designate the English people. It was first employed by Dean Swift. Its counterpart in the United States is Brother Jonathan (which see).

John Dory. See *Dory.*

John of Austria, commonly called DON JOHN OF AUSTRIA, the natural son of the emperor Charles V, was born at Ratisbon in 1545. In 1570 he conducted a campaign against the recalcitrant Moors of Granada with great vigor and relentlessness, and in the following year he commanded the allied fleet which won the great naval battle of Lepanto over the Turks (October 7, 1571). This was one of the greatest naval combats in history, and put an end to Mohammedan supremacy in the Mediterranean. In 1576 he was appointed governor of the Netherlands, and had just won along with the Prince of Parma the victory of Gemblours (1578) over William the Silent, when he died, not without suspicion of having been poisoned by his jealous half-brother, Philip II.

John of Gaunt, a corruption of *Ghent,* where he was born in 1339, was fourth son of Edward II and his queen Philippa, daughter of the Earl of Hainaut. He was created Duke of Lancaster in 1362; served in the French wars, and became governor of Guienne. He assumed in right of his wife the title of King of Castile, invaded the kingdom to assert his claims, but subsequently relinquished them in favor of Prince Henry of Castile, who had become his son-in-law. His eldest son, Bolingbroke, became king of England as Henry IV. He died February 3, 1399.

John of Leyden. See *Anabaptists.*

John o' Groat's House (popularly *Johnny Groat's House*), a house formerly situated about 1½ miles west of Duncansby Head, and forming about the most northern extremity of the mainland of Great Britain. According to legend, it was built in octagonal form, with eight doors, and contained an eight-sided table, to prevent disputes on precedence in the Groat family.

John's, EVE OF SAINT, a popular celebration of remote antiquity, held on the vigil or eve of the feast of the nativity of John the Baptist, June 24 (Midsummer Day). On the eve of the feast it was the custom in former times to kindle fires (called St. John's fires) upon hills in celebration of the summer solstice, and various superstitions were long practised on this occasion. The custom still lingers in some parts of Europe.

John's, ST. See *Saint John's.*

John's, ST., Antigua. See *Antigua.*

John Scotus. See *Erigena.*

Johns Hopkins University, one of the foremost universities of the United States, founded in 1876, in Baltimore, Maryland, by Johns Hopkins, a merchant of that city, and endowed by him with more than $3,000,000. Besides the library there are well-equipped laboratories for chemistry, biology, etc. There is an extensive teaching staff, and instruction is given to two grades of students, graduates and undergraduates. The former are such as have taken a degree here (that of B.A.) or elsewhere, and wish to carry their studies further, this university giving special attention to advanced studies of various kinds, as well as to original research. A number of periodicals are issued in connection with the university. There are, besides numerous scholarships, about twenty fellowships, each of the value of $500 annually. A hospital, also endowed by Johns Hopkins, is connected with this institution. Its present endowment amounts to more than $4,500,000.

Johnson (jon'son), ANDREW, seventeenth president of the United States, born in North Carolina in 1808; died in 1875. He was self-educated; entered Congress as a Democrat in 1843, and the Senate in 1857. In 1864 he was nominated as vice-president by the Republican party, and elected with Abraham Lincoln. He became president upon the assassination of Lincoln in April, 1865. During his term of office he was in constant conflict with the Senate and House of Representatives on account of his efforts to restore the Confederate States to their full former status without consultation with Congress. He was finally impeached by the House of high crimes and misdemeanors (February, 1868), and tried before the Senate, the trial ending in an acquittal, the requisite two-thirds major-

ity for conviction not being obtained. A general amnesty to the Confederates was his last presidential act. He was subsequently elected in Tennessee to the Senate by the Democratic party.

Johnson, EASTMAN, painter, was born at Lovell, Maine, in 1824. He studied art in Europe, in 1860 was made a National Academician, and in 1881 a member of the Society of American Artists. He devoted himself to portrait and genre subjects, two of his best-known works being *The Old Kentucky Home* and *The Husking Bee.* Others are *The Savoyard Boy, The Chimney Corner*, etc., embracing admirable delineations of common life. He died in 1906.

Johnson, REVERDY, statesman, born at Annapolis, Maryland, in 1796; died in 1876. Admitted to the bar in 1815, he practised law in Baltimore and attained eminence in his profession. He was elected by the Whig party to the United States Senate in 1845, and resigned in 1849, to become attorney general in President Taylor's cabinet. He was senator again 1863-68, being appointed Minister to England in the latter year. He was recalled in 1869.

Johnson, RICHARD MENTOR, vice-president, was born near Louisville, Kentucky, in 1780; died in 1850. He studied law, was elected to Congress in 1807, and continued a member until 1812, when he raised a company of mounted riflemen and took an active part in the war. He aided greatly in Harrison's victory of October, 1813, and it is believed that Tecumseh, the Indian chief, fell by his hand. He was dangerously wounded. He was elected to the Senate in 1819, returned to the House in 1829, and was chosen vice-president, under President Van Buren, in 1836. He was again the Democratic candidate for vice-president in 1840, but was defeated.

Johnson, RICHARD W., soldier, was born in Livingston county, Kentucky, in 1827, and was graduated at West Point in 1849. He remained in the army until the Civil war, being engaged in campaigns against the Indians. In 1862 he was made a major in the regular army, and as general of volunteers commanded a division at the battles of Stone River and Chickamauga. He served under Sherman in Georgia in 1864, took part in the battle of Nashville and commanded a division of cavalry in the pursuit of the Confederates. He was professor of military science in the University of Missouri in 1863-69 and of Minnesota, 1869-71. He died in 1897.

Johnson, ROSSITER, author, born at Rochester, New York, in 1840; was graduated at Rochester University in 1863. His works comprise *Phæton Rogers; Idler and Poet*, poem; *History of the War of 1812; History of the Old French War*, etc. He edited series of books and cyclopædias and was an associate editor of the *Standard Dictionary.*

Johnson, SAMUEL, an eminent English author, son of a bookseller, was born at Lichfield in 1709; died at London in 1784. He received his early education partly at the free school of Lichfield, and partly at Stourbridge, in Worcestershire. In 1728 he entered Pembroke College, Oxford, but was obliged by poverty to retire after three years

Samuel Johnson.

without taking a degree. He became successively an usher in Leicestershire, a bookseller's drudge in Birmingham, and the head of a school established with some money he acquired by marrying, in 1736, Mrs. Porter, the widow of a mercer, considerably older than himself, but to whom he was sincerely attached. The school speedily failed; and in 1737, removing to London, Johnson entered on his long course of literary toil. His reputation rose very slowly; the greater part of his time was wasted for many years on desultory and occasional efforts. A large proportion of his writings appeared in the *Gentleman's Magazine*, or as pamphlets; and most of these are quite forgotten. His two poetical satires, *London* (1738) and *The Vanity of Human Wishes* (1749), are striking specimens of reflection and diction, but neither they nor his tragedy of *Irene* entitle him to be considered as a great poet. *Rasselas* (1759), written in a week to pay for his mother's funeral, is one of the most interesting and characteristic of his works. His two sets of periodical essays,

The Rambler (1750-52) and *The Idler* (1758-60), were at first coldly received, but on being collected and reprinted they became very popular. For eight years from 1747 Johnson's attention was chiefly engaged upon his *Dictionary of the English Language*, a work which appeared in 1755, and is highly honorable to the author in the circumstances in which it was produced, but is of little real philological value. The dictionary, though it raised his fame, added little to his worldly means; and Johnson lived in poverty till 1762, when he obtained, through Lord Bute, a pension of £300 a year. He was thenceforth in easy circumstances, and could enjoy without restraint the society of Burke, Reynolds, Gibbon, Garrick, Goldsmith, and others in the famous club which became a formidable power in the world of letters. In 1763 the first interview with his now equally famous biographer, James Boswell, took place. In 1765 began his intimacy with the family of Mr. Thrale, the great brewer, and in the same year appeared his long-promised edition of Shakespere. In 1773 Johnson made a tour to the Hebrides in company with his friend Boswell, of which he gives a highly instructive account in his *Journey to the Western Isles of Scotland.* In 1775 he received the diploma of D.C.L. from the University of Oxford, and soon after visited France in company with the Thrales. His last literary undertaking was his *Lives of the Poets*, which was completed in 1781. He was buried in Westminster Abbey. Boswell's *Life* may be said to convey a more favorable impression of Johnson's real strength, both in thought and language, than anything in the works which he wrote and published.

Johnson, Tom Loftin, reformer, was born at Georgetown, Kentucky, in 1854. He invented street railway devices, became the owner of several railways, and was an iron manufacturer in Cleveland, Ohio, of which city he was reform mayor, 1901-10. He was a prominent advocate of the 'single tax' theory and vigorously sought to establish three cent railway fares. In this he succeeded in Cleveland. He died April 1, 1911.

Johnson, Sir William, a British officer, born in Ireland in 1715; died in 1774. Migrating to America, he settled near the Mohawk River, New York, became a friend of the Indians, and was adopted as a sachem by the Mohawks. In 1755 he won an important victory over the French army at Fort George. For this the government presented him 100,000 acres of land in the Mohawk valley, where he built the village of Johnstown.

Johnson City, a town in Washington county, Tennessee, 25 miles S. S. W. of Bristol. It has iron works, wood-working mills, etc. Pop. 8502.

Johnston (jonz'ton), Alexander Keith, geographer, was born near Edinburgh in 1804; died in 1871. His more important works were the *National Atlas*, first published in 1843; and his *Atlas of Physical Geography*, published in 1848, which gained him election to the leading geographical societies of Europe and America. Among his minor publications are an *Atlas of the Historical Geography of Europe;* and a *Dictionary of Geography* (better known as *Johnston's Gazetteer*).

Johnston, Albert Sidney, Confederate soldier, was born in Washington, Kentucky, in 1803. His services in the Black Hawk and Mexican wars were distinguished. On the outbreak of the Civil war he resigned with reluctance an important command to take part with his native South. In the battle of Shiloh, in which he commanded (April 6, 1862), Johnston received a mortal wound.

Johnston, Joseph E., Confederate soldier, was born in Longwood, Virginia, in 1809. He served in the Seminole Indian and Mexican wars. In the Civil war the victory of Bull Run was due to his reinforcement of Beauregard's army, and he was in command at Richmond until a wound at Fair Oaks compelled him to resign the command to General Lee. He was in the field against Grant at Vicksburg in 1863, but was too weak to save that city. He opposed Sherman's advance in 1864, and fought several battles, but was removed from his command, July 18. He was again opposed to Sherman in North Carolina in 1865, when the surrender of Lee ended the war. In 1877 he was elected to the United States Senate, and afterwards was made a commissioner of railroads. He died in 1891.

Johnstown (jonz'toun), a town in Cambria county, Pennsylvania, situated on the Conemaugh River, about 89 miles S. E. of Pittsburgh. It is the center of a flourishing manufacturing district, and the town and neighborhood in great part belong to the Cambria Steel Co., who are said to employ over 16,000 people in their steel mills. There are numerous other manufactories, and coal is largely produced in the vicinity. The town itself contained some 20,000 inhabitants, and along the Conemaugh River there was a total pop. of about

30,000, when, on May 31, 1889, this busy, thriving district was laid waste by the bursting of a dam at Conemaugh Lake, situated about 10 miles above the town. Houses, churches and factories were driven by the flood into a mass of ruin, which was finally piled up against the railway bridge at Johnstown, and its destruction completed by the outbreak of fire. Those who perished numbered about 2200. Pop. 55,482.

Johnstown, a city, capital of Fulton county, New York, 48 miles W. N. W. of Albany. Here gloves, mittens and shoe leather are largely manufactured. Pop. 10,447.

Joint-stock Companies, a species of partnerships in which a number of persons contribute funds or *stock* for the purpose of carrying on a trade or other profitable object. The management is vested in certain members called directors; and the general body of shareholders take no active part in the concerns of the company beyond exercising a control over the acts of the directors on special occasions. The capital is generally divided into equal shares, each member holding one or more, and in proportion to the number participates in the profits. After the stock of a company of this sort has been fully subscribed no one can enter it without previously purchasing one or more shares from some of the existing members. No member can demand payment of his share from the company, but he may, without consent of his fellow members, transfer his share to another person. In nearly all the States of this country joint-stock companies are now, by statute, invested with some of the privileges of corporations. Five or more persons associated for any lawful purpose may, by subscribing their names to a memorandum of association, form an incorporated company, with or without limited liability. The distinction between limited and unlimited liability companies is, that if an unlimited company contract any debts, no matter how large, every member is liable, if his fellow-members turn out unable to bear their proportions, to pay the whole of these debts to the extent of his fortune, whereas if the company is limited, each member can in no event be called upon to pay more than he expressly guaranteed. A company may be registered in one of three forms: 1, as a company limited by shares, where the liability of each member is limited to the amount unpaid on the shares; 2, as a company limited by guarantee, where the liability of each member is limited to such amount as he undertakes in the memorandum of association to contribute to the assets of the company if it should be wound up; and 3, an unlimited company, where there is no limit to the liability of the members. In the first two cases the word 'limited' must be added to the name of the company, and the amount of capital, object, place of business, and declaration of the limit or the amount of guarantee must be entered in the memorandum of association, which must be accompanied by articles of association providing for the management of the company. In Britain an annual list of members must be forwarded to the registrar of joint-stock companies, an official appointed by the Board of Trade; and there must be at least one office for registration in each of the three kingdoms. A general meeting of the company must be held at least once a year. A company may be wound up whenever it passes a special resolution to that effect; also whenever it does not commence business within a twelvemonth after incorporation, or if it suspends its business for a whole year; also whenever its members are reduced to less than seven; whenever it is unable to pay its debts; and lastly, whenever the court thinks it just and equitable that it should be wound up. Joint-stock companies are now common in all countries.

Joint-tenants, are those that hold lands or tenements, or other property, as goods and chattels, by one title, without partition. In a joint-tenancy the last survivor takes the whole, as if the estate had been given to him only, unless any of his companions have conveyed away their shares by deed.

Jointure (join'tūr), in law, a provision for a wife to take effect on her husband's death.

Joinville (zhwaṇ-vēl), Jean, Sieur de, a French historian, born in Champagne about 1224; died about 1317. He early entered the service of Thibaut, king of Navarre, and in 1248 raised a troop of nine knights and 700 armed soldiers, and accompanied Louis IX in his first crusade to the Holy Land. He rose high in favor with Louis, shared his captivity, returned with him to France in 1254, and spent much of his time at court. His *Histoire de St. Louis*, which is one of the most valuable literary productions of the middle ages, has been often reprinted.

Joists (joistz), in carpentry, are the beams of timber to which the flooring of rooms and the laths of a ceiling are nailed, and which rest on the walls or girders, and sometimes on both. They are laid horizontally, and in parallel equidistant rows.

Jokai (yō'kà-i), Mor, a Hungarian novelist, was born at Komorn in 1825. His first novel, *Working Days*, was published in 1845, after which he became a prolific and popular author, producing in all about 200 volumes of romances and novels, dramatic poems, humorous essays, etc. He died in 1904.

Joliba (jol'i-ba). See *Niger*.

Joliet (jō'li-et), a city, capital of Will County, Illinois, 37 miles S. W. of Chicago. It has an important state prison, large limestone quarries, and extensive manufactures, including large flour mills, machine shops, steel-works, breweries, rolling mills, horseshoe works, and many others. The barbed-wire plant is probably the largest in the world. The Des Plaines River affords water-power. Pop. 34,670.

Joliette, or Industry Village, a manufacturing and trading town, Quebec, Canada, 40 miles N. of Montreal. Pop. 6346.

Jolly-boat, one of the smaller boats carried by a vessel, and used especially for communicating with the shore. See *Boat*.

Jomelli (yo-mel'lē), Niccolo, an Italian musical composer, born in 1714; died in 1774. Among his chief works are *L'Errore Amoroso*, a comic opera; *Armida*, *Ifigenia*, *Caio Mario*, and other operas. While chapel-master at St. Peter's he composed his *Benedictus Dominus*, a masterpiece of music. His *Requiem* and *Miserere* are celebrated.

Jomini (zho-mi-nē), Henri, Baron, a distinguished soldier and military historian, born at Payerne, canton of Vaud, Switzerland, in 1779. He first served with the troops of his own country, but in 1804 joined the French army with the rank of major, accompanied Marshal Ney to Germany in 1805-07, and to Spain in 1808, in the capacity first of aide-de-camp, then of chief staff-officer. In 1808 he became a brigadier-general. He distinguished himself during the Russian campaign (1812), but subsequently entered the Russian service. He latterly retired to Brussels, and died at Passy in 1869. Some of his most important works are *Traités des Grandes Opérations Militaires ou Histoire Critique des Guerres de Frédéric le Grand; Principes de la Stratégie; Vie Politique et Militaire de Napoléon; Précis de l'Art de Guerre*, etc.

Jonah (Hebrew, signifying *dove*), one of the minor prophets, son of Amittai, and according to II Kings, xiv, 25, a contemporary of Jeroboam II, was born at Gath-Hepher, in Galilee. The book which bears his name is historical rather than prophetical, and the miraculous event of Jonah remaining three days and three nights in the belly of the fish has been regarded by some as an allegory. Orthodox theologians, however, are generally of opinion that the mention of it by Christ (Mat. xii. 39) obliges us to regard the event as really historical. Jonah's grave is shown at Mosul, the ancient Nineveh, and also at Gath.

Jones (jōnz), In'igo, the reviver of classical architecture in England in the beginning of the seventeenth century. He was born at London in 1572, and attracted the notice of the Earl of Pembroke, who sent him to Italy to study art. He went to Venice, where the works of Palladio inspired him with a taste for architecture. Having returned to England, he became court architect under James I and Charles I. Among his best-known works are the Banqueting House at Whitehall, Asburnham House, Covent Garden Piazza, Heriot's Hospital, Edinburgh and Shaftesbury House. Being a Roman Catholic and the partisan of royalty, he suffered heavy losses during the civil war, and died in poverty in 1652.

Jones, Jacob, naval officer, born near Smyrna, Delaware, in 1768; died in 1850. Joining the navy, he served in the war against Tripoli, was taken and held prisoner for 18 months. He is best known for his capture of the *Frolic* by the *Wasp* in 1812. Congress voted him a gold medal for his exploit.

Jones, John Paul, a famous naval commander, was born in Kirkcudbrightshire, Scotland, in 1747. His father, whose name was John Paul, was gardener to the Earl of Selkirk. He entered the merchant service, was engaged in the American and West Indian trade, and is said to have realized a handsome fortune. He settled in Virginia and on the outbreak of war between the colonies and mother country he offered his services to the former. After some service on the coast, in which he showed valor and ability, in 1778, being then in command of the *Ranger*, he crossed to the British seas and made a descent on Whitehaven, set fire to the shipping, and kept England and Scotland in constant alarm. In 1779, in command of the *Bon Homme Richard*, he threatened Leith, and captured the British vessel *Serapis* after a most desperate engagement off Flamborough Head. This has since been looked upon as one of the greatest of naval combats and Jones has been regarded as chief among American naval heroes. On his return to America, Congress voted him a splendid gold medal, with a resolution

commending his zeal, prudence and intrepidity. At the conclusion of peace Jones went to Paris as American agent for prize-money. In 1787 he entered the Russian navy as rear-admiral, and performed valuable service against the Turks. He died at Paris in 1792. His remains were discovered in that city in 1905 and brought to the United States, to be interred in the Naval Academy grounds at Annapolis.

Jones, Owen, a British artist and decorator, born in 1809. He studied art under Lewis Vulliamy, and traveled in Italy, Turkey, Egypt and Spain. In the last-mentioned country he collected the materials for his great work on the Alhambra—*Plans, Sections and Details of the Alhambra*, completed in 1845. In 1842 Jones published his *Designs for Mosaic and Tesselated Pavements*, and in 1846 the *Polychromatic Ornament of Italy*. He was appointed a superintendent of the works for the Great Exhibition of 1851, and afterwards director of decorations at the Sydenham Crystal Palace, and had the special superintendence of the Egyptian, Greek, Roman and Alhambra Courts. In 1856 his *Grammar of Ornament* was published, and it still remains a text-book of examples, if not of principles. His last important work was his *Examples of Chinese Ornament* (1867). He died in 1874.

Jones, Sir William, an English lawyer and oriental scholar, born in 1746. He was educated at Harrow and Oxford, and early acquired a reputation as a linguist, Hebrew, Persian, Arabic and even Chinese, besides German, Italian, French, Spanish and Portuguese, being among his acquisitions. In 1770 his translation (in French) of the life of Nadir Shah from the Persian appeared; in 1771 his grammar of the Persian language; in 1771 his *Poeseos Asiaticæ Commentariorum, Libri Sex;* and in 1781 his translation of the seven Arabic poems known as the *Moallákat*. He had been called to the bar in 1774, and in 1783 was nominated judge in the supreme court of judicature, Bengal, and knighted. Here he did much for the furtherance of oriental studies, being one of the first Europeans to study Sanskrit, founding the Royal Asiatic Society, translating the *Sakuntala*, the *Ordinances of Manu*, besides tales, poems, extracts from the *Vedas*, etc. He also undertook a digest of the Hindu and Mohammedan laws, which he did not, however, live to complete. He died in Calcutta in 1794.

Jonesboro, a city, capital of Craighead county, Arkansas, 67 miles N. N. W. of Memphis, Tennessee. It is a lumber center and has large heading works, box factories, etc. Pop. 7123.

Jongleurs (zhon-l*eur*), a class of French minstrels in the middle ages who used to wander about entertaining people by song, music, story, etc., and sometimes by juggling feats, tumbling, etc.

Jönköping (yeun-cheup'ing), a town of Sweden, capital of the län of same name, at the southern extremity of Lake Wetter, 83 miles E. N. E. of Gothenburg. It is in general well built, and has manufactures of matches, leather, etc. Pop. 23,143.

Jonquil (jon'kwil), a bulbous plant of the genus *Narcissus* (*N. Jonquilla*), allied to the daffodil. It has long lily-like leaves, and spikes of yellow or white fragrant flowers. The sweet-scented jonquil (*N. odōrus*), a native of southern Europe, is also generally cultivated. Perfumed waters are obtained from jonquil flowers.

Jonson (jon'sun), Ben or Benjamin, a celebrated English poet, the contemporary and friend of Shakespere. He was the posthumous son of a clergyman, and was born in 1574, at Westminster. He was placed at the Westminster grammar school, under Camden, at an

Ben Jonson.

early age, where he laid the foundation of his learning, but was ultimately withdrawn, it is said, by his stepfather, a master bricklayer, who wanted his assistance in the business. He soon tired of this occupation, entered the army as a private soldier, and showed much personal courage during a campaign in Holland. Returning to England he began his career as an actor, and in 1598 his drama, *Every Man in His Humor* was printed. About this time Jonson was in some

danger of the gallows on account of having slain an actor in a duel, and was actually imprisoned for some time. In 1599 he brought out his comedy of *Every Man out of His Humor*, which was followed by *Cynthia's Revels* (1600); the *Poetaster* (1602); and *Sejanus*, a tragedy (1603). The festivities which welcomed the new king, James I, gave a new impulse to the representation of masques, in the composition of which the ready talent of Jonson was employed by the court itself, the celebrated Inigo Jones doing the decorations. In 1604 he had some share with Chapman and Marston in writing *Eastward Ho*, certain passages of which, reflecting satirically on the Scotch nation, drew down the anger of the king, and nearly cost the authors their nose and ears. In 1605 his comedy of *Volpone, or the Fox*, appeared; in 1609 *Epicœne, or The Silent Woman;* in 1610 the *Alchemist;* in 1611 *Catiline*, a tragedy; and in 1614 *Bartholomew Fair*, a complete picture of Elizabethan low life. In 1613 Jonson made a tour in France as governor of Sir Walter Raleigh's eldest son. In 1618 he visited Scotland, staying for some time with Drummond of Hawthornden, whose notes of his guest's conversation are among the best accounts we have of Jonson's personality. In 1619 he returned to England, received the honorary degree of A.M. from Oxford University, and on the death of the poet laureate was appointed his successor, and the salary raised to the sum of £100 by Charles I. Much of his time was spent at the Apollo, Mermaid, and other taverns, feasting, drinking and engaging in those brilliant contests of wit in which in earlier days Shakespere also took part. His later days were spent, not perhaps in much pecuniary prosperity, but certainly in fame and honor, as the acknowledged chief of English literature. He died in 1637, of an attack of palsy, leaving behind him an unfinished pastoral drama of great beauty, *The Sad Shepherd.* He was buried in Westminster Abbey, where a monument was erected to his memory with the inscription, 'O rare Ben Jonson.' Jonson's best dramas are excellent in plot and development, have strongly conceived characters and excellent traits of humor, but he is sometimes forced and unnatural, and deals perhaps too much with passing manners and eccentricities. He had a genuine lyrical power, seen in his short poems and the songs interspersed in his masques.

Joplin (jop'lin), a city of Jasper county, Missouri. It is the commercial center of the southwest Missouri lead and zinc region, the output of which is very large. It contains large smelting and white lead works. Pop. 32,078.

Joppa. See *Jaffa.*

Jordaens (yor'däns), Jakob, historical and portrait painter, born at Antwerp in 1594. He studied under his father-in-law, Van Oort, and then under Rubens, and has the reputation of being, after Rubens, Antwerp's greatest painter. His pictures, the subjects of which are mostly mythological scenes, and scenes from Flemish popular life, banquets, etc., are to be found in the chief European collections. His style is less elevated and powerful than that of Rubens, but preserves more of the national Flemish humor and realistic force. He died in 1678.

Jordan (jor-dan), the largest river in Palestine, and one of the most celebrated rivers in the world. It rises from several sources, uniting in Bahr el-Hûleh, or the Waters of Merom. From this point it flows with a rapid current in a narrow rocky bed, and falls after a southerly course of about 10 miles into Lake Tiberias. Shortly after leaving the south end of this lake it enters a broad valley or *ghor*, called in the Bible 'the plain'; and continuing a southerly but singularly crooked course of about 70 miles direct distance, or 200 including windings, falls into the north end of the Dead Sea, having received the Zerka or Jabbok, also on the left, and numerous smaller affluents. The upper part of the valley of the Jordan is hilly, arid, and barren, but it becomes more level and fertile as it approaches the Zerka. The river is muddy and full of small fish. In the dry season it is shallow, with an average width of from 30 to 50 yards. At its mouth it is about 180 yards broad and about 3 feet deep. It is subject to great inundations during the winter season. The valley of the Jordan forms one of the most remarkable depressions in the world, the Dead Sea being 1312 feet below sea-level, and the total fall of the river being about 2300 feet.

Jordan, David Starr, naturalist, born at Gainesville, New York, in 1851. He became professor of biology at Butler University, Indianapolis, and subsequently in the University of Indiana. He investigated for the Census Bureau the marine industries of the Pacific coast, 1879-81. He has been president of Leland Stanford, Jr., University since 1891, and has written numerous works, including a *Manual of Vertebrates*, *Synopsis of the Fishes of North America*, and many other works and papers on scientific and general subjects.

Jordan, William George, editor, born at New York in 1864; educated at the College of City, of New York; was successively editor of *Book Chat, Current Literature, Saturday Evening Post* and *Search Light.* In 1907, he proposed the organization of a House of Governors, to work for uniform legislation between the States. This led, in 1908, to the call by President Roosevelt, of a convention of governors at Washington, at which arrangements were made for annual meetings. An organization was formed of which Mr. Jordan was appointed secretary. He is the author of *Mental Training, The Power of Truth, The Crown of Individuality, The House of Governors*, etc.

Jornandes (jor-nan'dez; properly *Jordanes*), the historian of the Goths, and himself a Goth, was born about 500 A.D., was at first a vows, and is said to have been appointed bishop of some Italian city, probably Ravenna or Croton. Of his two works the chronicle *De Regnorum et Temporum Successione* is of value only when it approaches his own time. The other work, *De Rebus Geticis*, treating of the Goths, based on the lost history of Cassiodorus, is invaluable.

Jorullo, Xorullo (*hō*-rụl'yō), a volcano of Mexico, in the department of Michoacan, 160 miles southwest of Mexico, thrown up in 1759; height, about 4150 feet. There are at present scarcely any signs of activity about the mountain.

Joseph (jō'zef), one of the two sons of the patriarch Jacob by his favorite wife Rachel. His father's preference for him drew down the enmity of his elder brothers, who sold him to some Ishmaelitish slave-dealers, by whom he was sold to Potiphar, a distinguished officer in Egypt. The story of his elevation to the position of vice-regent of Egypt and the settlement of his father and brothers there is well known (Gen. xxxvii.—l). Authorities still differ as to the period in Egyptian history to which Joseph's life belongs, some placing it before, others under, and others after the time of the Hyksos or shepherd kings of Egypt.

Joseph, the husband of Mary the mother of Jesus, was a descendant of the house of David, though resident at Nazareth, where he followed the trade of a carpenter. Early tradition represents him as an old man at the time of his marriage, and he seems to have died before the commencement of the public ministry of Jesus. His day in the Roman Catholic calendar is March 19.

Joseph of Arimathæa, *i.e.*, of Ramathaim in Benjamin, a member of the Jewish Sanhedrim, who, though a believer in Jesus, had not the courage to make open profession of his faith. Nevertheless, after the crucifixion he went to Pilate, begged the body of Jesus, and along with Nicodemus buried it in his own garden. According to tradition he went as apostle to England. His day of celebration is March 17th.

Joseph I, Emperor of Germany, eldest son of Leopold I, born in 1678; became emperor in 1705. He was a zealous member of the alliance against France in the war of the Spanish succession, in which the victories of Marlborough and Eugene won glory for the imperial arms. He died in 1711.

Joseph II, Emperor of Germany, son of Francis I and Maria Theresa, was born in 1741. He was elected king of the Romans in 1764, and on the death of his father, 1765, German emperor, succeeding his mother, however, in the hereditary estates of the House of Austria only in 1780. He at once commenced an extensive scheme of reforms, but the country was not prepared for such sudden changes, and he was compelled to give up most of his plans. In 1788 he visited Catharine II at Cherson, and in league with her made war against Turkey. He died in 1790.

Joséphine (zhō-sā-fēn), Empress of the French, was born in Martinique, June 24, 1763, being the daughter of Lieutenant Tascher de la Pagerie. She married in 1779 Vicomte Alexandre Beauharnais, by whom she had two children, Eugène and Hortense. In 1794 her husband, who had been commander of the army of the Rhine, was executed by order of the Convention. She herself had a narrow escape, having been included in the list of proscription. After the fall of Robespierre she paid a visit to Napoleon to thank him for restoring the sword of her husband, and so pleased him that he soon after married her (1796). She became a beneficial element in his life, and her amiable manners won the hearts of everybody and helped to secure her husband's position. When Napoleon ascended the throne in 1804 she was crowned along with him. But the fact that the union was childless stood in the way of Napoleon's ambition to become the founder of a dynasty, and in 1809 Josephine was divorced, retiring to her beautiful seat of Malmaison, with the title of empress-queen-dowager and an annual grant of two million francs. She died in May, 1814.

Joseph's-coat, a popular American name for *Amaranthus tricolor.*

Joseph's-flower, the *Tragopogon pratensis* or yellow goat's-beard. See *Goat's-beard.*

Josephus (jō-sē'fus), FLAVIUS, the historian of the Jews, was born at Jerusalem in 37 A.D., and was carefully educated. In 64 A.D. he made a journey to Rome, and was introduced to Poppæa, the wife of Nero. On his return he found his countrymen preparing to throw off the Roman yoke, and having tried in vain to persuade them of the hopelessness of such a struggle, he accepted the post of defending the province of Galilee, and actually held the fortified town of Jotapata against the whole Roman army for forty-seven days. He was captured at the fall of the city, was afterwards present in the Roman army at the destruction of Jerusalem (A.D. 70), and went with Titus to Rome, where, assuming the family name of his patron, Flavius, he lived in learned leisure. Here he wrote (in Greek) *The History of the Jewish War; The Antiquities of the Jews,* giving a history of the Jews from the earliest times to the reign of Nero; an *Autobiography,* mostly relating, however, to the time of his military activity; and a work on the *Antiquity of the Jewish People,* directed against Apion, an Alexandrian grammarian. The date of his death is uncertain. He certainly saw the end of the century.

Joshua (josh'ū-a), the successor of Moses in the command of the Israelites, was the son of Nun, of the tribe of Ephraim. His name was at first *Hoshea* (help), but was changed by Moses into *Joshua* (Jehovah's help), of which *Jesus* is the Greek form. He was the only one, with the exception of Caleb, who brought back an encouraging report from the land of Canaan. He was nominated by Moses to succeed him in the command of the army of Israel, led the Israelites over the Jordan, and in the course of seven years conquered the greater part of Palestine, and divided the country among the tribes. He died at Timnath-Serah in Mount Ephraim at the age of 110. His history is contained in the canonical book which bears his name, and of which he has been usually regarded as the author; but modern critics have shown that it is a composite narrative, and contains references to many events which took place after Joshua's death.

Josiah (jō-sī'a), King of Judah, succeeded his father Amon at the age of eight years (639 B.C.). He is characterized in the Scriptures as doing 'that which was right in the sight of the Lord.' He took an active part in the reform of public worship, and commenced the restoration of the temple, during the progress of which the high priest Hilkiah discovered the book of the law, thought by some to be substantially the same as the book of Deuteronomy. The prescriptions it contained gave a decided direction to the reform movement which the king conducted with great vigor. In his thirty-first year, prompted probably by friendship to the King of Assyria, he marched out against Pharaoh Necho, who was on his way to attack that kingdom. The two armies met at Megiddo, where Josiah was slain.

Jósika (yō'shi ká), MIKLOS, BARON, a Hungarian novelist, born in 1796. He entered the Austrian army, but in 1818 resigned his commission, and settled down to literary work. Drawn into politics he became a zealous supporter of Kossuth, and during the revolution of 1848 was a member of the committee of national defence. On the fall of the revolutionary government he escaped to Brussels, where he resided till 1864. He died at Dresden in 1865. He produced about sixty volumes of romances, which are very popular in Hungary. *Abafi,* the most successful of these, appeared in 1836.

Josquin des Prez (zhos-kaṇ dā prā), a musical composer, born between 1450 and 1455 in Northern France. He received an appointment in 1475 in the papal chapel at Rome, and latterly became chapelmaster to Louis XII. He died at Condé in 1521, where he held a canonry.

Joss-stick, in China, a small reed covered with the dust of odoriferous woods, and burned before an idol.

Jotuns (yō'tụnz), in northern mythology, immense giants and magicians who had command over the powers of nature, and lived in dark caves in their kingdom of Jotunheim, from which they waged perpetual war against the Æsir, the bright gods of Valhalla. Originally they represented the destructive forces in nature. They were cunning, malignant, versed in witchcraft, but not highly intelligent.

Joubert (jö'bert), PICTRUS JACOBUS, Boer president, born at Congo, Cape Colony, in 1834. He migrated from Cape Colony with the Boers, settled in the Transvaal, was elected to the Volkaraad in 1863, and made president in 1874. War having begun against the

British in 1880, he won a decided victory against them in 1881, a treaty of peace following. He was elected vice-president in 1883, contested the Presidency in 1888, and in 1899 commanded the army in Natal, defeating the British in several engagements, and besieging Ladysmith for several months. He died in 1900.

Joudpore. See *Jodhpur.*

Jouffroy (zhö-frwä), THÉODORE SIMON, a French philosopher, born in 1796. He studied philosophy under Cousin, held the position of professor of philosophy in different colleges and normal schools; taught for some years in the College of France, and became a member of the Academy. He died at Paris in 1842. In philosophy he was mainly a follower of the Scottish school of Reid and Steward, some of whose works he translated into French. His own principal works are *Mélanges Philosophiques* and *Cours d'Esthétique.* As an original thinker Jouffroy has no claim either to profundity or intellectual brilliancy, but he had a talent for popular exposition, and followed prudent lines of speculation.

Jougs (jugz), an instrument of punishment formerly used in Scotland, consisting of an iron collar which surrounded the neck of the criminal, and was fastened to a wall or tree by an iron chain.

Jougs.

Joule (jōl), JAMES PRESCOTT, an English physicist, born in 1818. He studied under Dalton, the chemist, made researches in electro-magnetism, about 1840 turned his attention to the subject of heat, and ultimately established the theory of the mechanical equivalent of heat. His published work consists mainly of papers read before the Royal Society, of which he was made a fellow in 1850, receiving its medal in 1852 and the Copley medal in 1870. He received in 1878 a civil list pension of £200 in recognition of his services to science. His most important achievement was that of settling the mechanical equivalent of heat, which established that the quantity of heat capable of increasing the temperature of 1 lb. of water by one degree Fahrenheit requires for its evolution the expenditure of mechanical energy represented by the fall of 772 lbs. through the space of one foot. He died in 1889. See *Heat.*

Jourdan (zhör-dän), JEAN BAPTISTE, COUNT, marshal and peer of France, born in 1762; died in 1833. He distinguished himself under Dumouriez, ws made a general of division in 1793, defeated the Austrians at Wattignies and at Fleurus, drove them beyond the Rhine, and took the fortress of Luxembourg, but was defeated at Höchst, and again at Würzburg (1796). In 1799, the Directory having given him the command of the army on the Danube, he crossed the Rhine at Basel, but was encountered by the Archduke Charles, who completely defeated him at Stockach. In 1803 he became a member of the senate, and in 1804, on the establishment of the empire, obtained the rank of marshal, the title of count, and a seat in the council of state. After the restoration he was raised to the peerage. He entered with spirit into the revolution of 1830. He wrote two works—*Mémoires pour servir à l'Histoire de la Campagne de 1796*, and *Opérations de l'Armée du Danube.*

Journalism (jur'nal-izm). See *Newspapers.*

Journey-weight, a term applied at the English mint to the weight of certain parcels of coin, which were probably considered formerly as a day's work. The journey-weight of gold is 15 troy lbs., which is coined into 701 sovereigns, or 1402 half-sovereigns. A journey-weight of silver weighs 60 lbs. troy, and is coined into 792 crowns, or 1584 half-crowns, or 3960 shillings, or 7920 sixpences.

Jovellanos (*h*ō-vel-yä'nōs), GASPAR MELCHIOR DE, a Spanish statesman and writer, born in 1744; died in 1811. It is mainly as a political economist and legist that he stands in the front rank as a Spanish writer; but he also wrote satires and miscellaneous pieces, a tragedy, *El Pelayo*, etc.

Jovianus (jō-vi-an'us), FLAVIUS CLAUDIUS, a Roman emperor, was originally captain of the household troops of the emperor Julian, whom he accompanied in the disastrous campaign against the Persians in which Julian lost his life (A.D. 363). After Julian's death he was proclaimed emperor by the troops, but could only extricate his army by ceding to the Persian monarch the five provinces beyond the Tigris. He was found dead in his bed when on his way to Constantinople, 364.

Jowett (jow'et), BENJAMIN, an English scholar, master of Balliol College, Oxford, was born in 1817; died in 1893. He studied at Oxford, was elected to a fellowship in 1838, and became regius professor of Greek in 1855.

In 1855 he published a commentary on the *Epistles of St. Paul.* In 1860 appeared his essay on the *Interpretation of Scripture* in the celebrated *Essays and Reviews*, for which he was tried on a charge of heresy before the chancellor's court, but was acquitted. In 1870 he became master of Balliol, and in 1871 published his most important work, a translation of the *Dialogues of Plato.* He also published translations of Thucydides (1881) and the *Politics of Aristotle* (1885). In 1882 he was elected vice-chancellor of the university.

Juan (*hụ*-ån′), the Spanish form of *John.* See *Don Juan.*

Juan de Fuca (jö′an), STRAIT OF, the strait between Vancouver Island and the State of Washington on the west coast of the United States.

Juan Fernandez, so called from the name of its discoverer, also sometimes Mas-a-Tierra, an island in the South Pacific Ocean, about 400 miles off the coast of Chile, to which it belongs. It is 18 miles long and 6 miles broad at the broadest part, mountainous, and of rugged aspect. Parts of it are fertile, producing various kinds of timber, peaches, figs, grapes, cherries, etc. There are excellent fish. The island is occupied by some hundreds of settlers, whose chief occupation is the furnishing of fresh vegetables, water, and wood to the whaling or other vessels that call here. De Foe is said to have founded his Robinson Crusoe on the history of the solitary residence here for over four years (1704-09) of a Scotch sailor, Alexander Selkirk, though his location of the island meant by De Foe is now denied.

Juarez (*hụ*-à-reth′), BENITO PABLO, President of the Mexican Republic, was born of pure Indian parentage in 1806, and was elected president in 1861. He declared the suspension of public payments for two years to Europeans, a step which occasioned the interference of Britain, Spain and France. Troops were landed in Mexico in 1862, but Britain and Spain soon retired, leaving Napoleon III to carry out his views alone. Maximilian of Austria came on Napoleon's invitation to assume the throne, but Juarez, in spite of defeats and losses, continued to head a resistance, and when Napoleon under pressure from the American government withdrew his troops in 1866, the republicans carried all before them. Maximilian was captured and shot after a mock trial, and Juarez was reëlected to the presidency (1867), which position he held till he died (1872).

Juba I (jö′ba), king of Numidia, North Africa, in the first century B.C. On the breaking out of the civil war Juba fought against Cæsar; but being conquered in a battle at Thapsus, and abandoned by his subjects, he slew himself, in B.C. 46.—His son, JUBA II, was led in Cæsar's triumph at Rome, was carefully educated, and, having gained the favor of Augustus, received in marriage the daughter of Antony and Cleopatra, and was restored to the kingdom of his father, in B.C. 30, which some years after he exchanged for Mauritania. He wrote a history of Rome in Greek, a history of Arabia, treatises on the drama, painting, grammar, etc., of which only fragments are extant. He probably survived till 18 or 19 A.D.

Jubæa (jö-bē′a), a genus of palms. See *Coquito.*

Jubbulpore. See *Jabalpur.*

Jubilee (jö′bi-lē), a festival of the Jews, held every fiftieth year. During this year all slaves or captives were to be released; all estates which had been sold reverted to their original proprietors or their descendants; and the ground was to lie fallow. It has been doubted whether the law of jubilee was ever actually observed until after the return from the Babylonian exile, when, for a time at least, it came into operation. In 1300 a jubilee was instituted by Boniface VIII, who issued a bull granting plenary indulgence to all pilgrims who should visit Rome that year and perform certain ceremonies. The result was a vast concourse of pilgrims, from whom the church drew so much profit that in 1350 Clement VI declared a jubilee every fiftieth year, and in 1389 Urban VI every thirty-third year, and in 1470 Paul II every twenty-fifth year. The Reformation, which interfered with the sale of indulgences, sensibly diminished both the enthusiasm and the profits. The last jubilee, the twenty-second, was held in 1875.

Judæa (jö-dē′a), a term applied after the return of the Jews from exile to that part of Palestine bounded east by the Jordan and the Dead Sea, north by Samaria, west by the Mediterranean, and south by Arabia Petræa. See *Palestine.*

Judah (jö′da), the fourth son of the patriarch Jacob by his wife Leah, the progenitor of one of the twelve tribes. See *Jews.*

Judas (jö′das), surnamed *Iscariot*, meaning, perhaps, the man of Kerioth, a village of Judæa, was one of the twelve apostles of Jesus, and betrayed

his Master into the hands of the Jewish priests for thirty pieces of silver. Remorse for his crime led him to suicide. The Cainites, Cerinthians, and some other heretics held him in great veneration, believing that he alone saw the necessity for bringing about the fulfilment of prophecy and the atonement for humanity. Others have thought that his object was to oblige his Master to use his miraculous power to defeat his enemies and establish the new earthly kingdom of the Messiah, in which Judas expected to have a high place.

Judas, or JUDE, brother of James, one of the twelve apostles. Matthew and Mark call him *Thaddæus surnamed Lebbæus.* Nothing is known of his life. By many he is considered the author of the epistle of Jude. See *Jude, Epistle of.*

Judas Maccabæus. See *Maccabees.*

Judas-tree (*Cercis Siliquastrum*), nat. order Leguminosæ, is a native of the Levant, Spain, south of France, Italy, etc. It grows to the height of about 20 feet, with pale green leaves and beautiful purple flowers, which are eaten mixed with salad or made into fritters. *C. canadensis*, or red-bud, another species, growing in Canada and the United States, is smaller.

Jude (jöd), EPISTLE OF, one of the books of the New Testament. Its canonicity was questioned by the primitive church, and often since. The Asiatic churches did not make use of it till the fourth century, nor was it known in the West till towards the close of the second. Its quotation from the apocryphal book of Enoch raised a prejudice against it, but it was eventually allowed to take its place as a portion of the sacred canon. It is a passionate denunciation of heretics and false teachers and has been supposed by some to be written by Judas, the brother of the Saviour, and not by Judas, the brother of James (see above).

Judge (juj), a person duly invested with authority to determine causes or questions between parties according to law. The term is quite a general one, being applicable to any one appointed to sit in a court of law and try causes. The title of *justice* is used for the judges of the Supreme Courts, etc. The judge at common law decides points of law, and enables the jury rightly to decide questions of fact, while in equity he decides both classes of questions. A judge cannot be prosecuted for the consequences of his decisions, except in the case where he may have acted without jurisdiction, nor can he officiate in a case where he has a personal interest, unless it be merely his common interest as a citizen, taxpayer, etc.

Judge Advocate, an officer appointed to preside at the proceedings of courts-martial, his duties being to summon witnesses, administer oaths, take a minute of the proceedings, advise the court on points of law, etc.

Judges, in Hebrew history. See *Jews.*

Judges, BOOK OF, a canonical book of the Old Testament, so called because the greater part of the narrative is occupied with the history of the judges who were raised up to deliver their countrymen from the oppressions of their neighbors. The first chapter, although formally connected with the book of Joshua by the opening sentence, evidently contains a separate portion of the history of the Israelitish invasion of Canaan, the first settlement, indeed, west of the Jordan, in which the tribes of Judah and Simeon play a distinct part in the conquest. The 6th verse of the 2d chapter again connects the work with the concluding part of the book of Joshua, and in the chapters which follow the history of the nation is written from an ideal and poetic point of view, which gives it unity, the judges being represented as successive rulers, although in most cases their history and influence were merely local. The third part of the book begins at chap. xvii, and has no formal or chronological connection with what has gone before, and has sometimes been called an appendix.

Judgment (juj'ment), in law, the judicial determination and decision of a court in an action. It is either interlocutory or final. In the former case it is given only on some particular point or proceeding, and does not complete the action in the same way as the final judgment, upon which, unless it be appealed against, suspended, or recalled, execution may follow.

Judgment-debt, in law, a debt secured to the creditor by a judge's order, and in respect of which he can at any time attach the debtor's goods and chattels. Such debts have the preference of being paid in full, as compared with simple contract debts.

Judith (jö'dith), widow of Manasses, a Jewish heroine, whose history is given in the apocryphal book which bears her name. Judith is represented as going out to the tent of Holo-

fernes, an Assyrian general who was besieging Bethulia, the city in which she lived, charming him with her beauty, and taking advantage of the admission to his tent, thus afforded to her, to cut off his head with his own sword while he slept.

Judy. See *Punch.*

Juel (yu̯'el), NIELS, a Danish admiral, born in 1629 at Copenhagen. He served in the Dutch navy under Tromp and De Ruyter against the English and the Moors of Barbary, entered the Danish service in 1656, was made admiral, took the island of Gothland from the Swedes in 1676, and defeated them the following year in the famous sea-fight in the bay of Kjöge. He died in 1697.

Juggernaut. See *Jagannâtha.*

Juggling. See *Legerdemain.*

Juglandaceæ (jug-lan-dā'se-ē), the walnut tribe, a nat. order of exogenous plants, chiefly found in North America. They are trees with alternate pinnate stipulate leaves and unisexual flowers, the males, in catkins, the females in terminal clusters or loose racemes. Besides the walnut the order includes the butternut and hickory.

Jugular Vein (jug'ū-lâr), one of the large trunks by which the greater part of the blood that has circulated in the head, face and neck is returned to the heart. There are two on each side, an external or superficial, and an internal or deeper.

Jugurtha (ju-gur'tha), a king of Numidia, a natural son of Masinissa. Micipsa, his father's brother, and king of Numidia after Masinissa (B.C. 149), adopted him, and brought him up with his own sons, Adherbal and Hiempsal. Micipsa did his best to conciliate him, and declared him joint-heir to the crown with his two sons. But after the death of Micipsa Jugurtha had Hiempsal murdered and drove Adherbal from the country. Adherbal appealed to Rome, and after several Roman expeditions into Numidia, Jugurtha was captured (B.C. 106), led in the triumph of Marius at Rome, and finally thrown into a dungeon, where he was starved to death.

Juiz de Fora (zhö-is' dā fo'rà), or PARAHYBUNA, a town of Brazil, province of Minas Geraës, on the Parahybuna River. Pop. 8000.

Jujube (jö'jöb), the popular name of a genus of spiny and deciduous shrubs or small trees, genus *Zizyphus*, nat. order Rhamnaceæ. The species are numerous, and of several the fruit, which is blood-red or saffron-colored with a sweet granular pulp, is wholesome and pleasant to eat. The common jujube (*Z. vulgāris*) is a native of Syria, from which it was introduced into Europe. The fruit is dried and forms an article of commerce. *Z. Lotus*, which some believe to have given name to the ancient Lotophagi, a

Jujube (*Zizyphus vulgāris*).

shrub 2 or 3 feet high, is a native of Persia and the north of Africa. *Z. spina Christi*, or Christ's Thorn, is said to have furnished the branches of which our Saviour's crown of thorns was made. —The name jujube is also given to a confection made of gum-arabic or gelatine, sweetened and flavored so as to resemble the jujube fruit.

Jujuy (*hu̯-hö'*i), a town of the Argentine Republic, capital of a province of same name, is situated on the Rio Grande, and carries on an active trade with Chile and Bolivia. Pop. 4159. —The province has an area of 19,000 sq. miles, and a pop. of 55,450.

Julep (jö'lep; from Persian, *gulâb*, rose-water), a sweet drink; specifically, in medicine, a solution of sugar in aromatic water, but not so concentrated as syrup. In the United States the name is given to a drink composed of spirituous liquor, as brandy or whiskey, sugar, pounded ice, and a seasoning of mint. It is also called mint-julep.

Julia (jö'li-a), the only child of the emperor Augustus, was his daughter by his second wife Scribonia, and was born B.C. 39. She was first married (B.C. 25) to her cousin, the young Marcellus, and afterwards to Marcus Vipsanius Agrippa, to whom she bore three sons and two daughters. On Agrippa's death, in B.C. 12, she was married to Tiberius, who left her on account of her licentiousness. Augustus banished her to Pandataria, a desolate

island on the coast of Campania, ultimately allowing her to live in Rhegium. After the death of the emperor, Tiberius treated her with great severity. She died in A.D. 14, in poverty and distress. Her son Agrippa had been put to death by Tiberius shortly before.

Julian (jö'li-an), FLAVIUS CLAUDIUS JULIANUS, a Roman emperor, whom ecclesiastical writers have surnamed the *Apostate*, son of Julius Constantius (brother of Constantine the Great), was born at Constantinople in 331. When hardly six years old his father and several members of his family were murdered by the soldiers of his cousin, the emperor Constantius. He was brought up in the Christian religion, studied philosophy and letters, and resided in Athens, where he was induced to embrace paganism. Having received command of an army against the Germans, he defeated them at Strasburg, and drove them beyond the Rhine. He also displayed great talent as an administrator in Gaul. The emperor now became jealous of Julian, and recalled his best troops under pretense that he wanted to employ them against the Persians. This order caused rebellion among the soldiers, who proclaimed their leader Julian emperor in March, 360, in spite of his own resistance. Constantius prepared to proceed against him, but soon after died, and Julian was generally recognized as emperor. He began by putting a stop to many abuses, and limiting the splendor of his court, and was thus able to remit to the people the fifth part of all their taxes. He sought to restore the heathen worship in all its splendor, and on that account opposed Christianity as much as was in his power, without, however, persecuting the Christians themselves. He even sought to falsify the words of Christ by rebuilding the Jewish temple. In 363 he headed an expedition against the Persians, and took several cities, but was mortally wounded. He was an able ruler, and had also a reputation as an author. Some of his works have come down to us, including speeches, letters, and satirical pieces; the latter are distinguished for wit and humor. He wrote also a work against the Christian religion, of which we have yet some extracts.

Julian Calendar. See *Calendar* and *Epoch*.

Jülich (yü'li*h*), a town of Rhenish Prussia, 17 miles northeast of Aix-la-Chapelle. It was long the capital of an independent duchy. Pop. 5459.

Julien (zh ü-lē-a n), STANISLAS-AIGNAN, the leading Chinese scholar of his day, was born at Orleans, France, in 1799, and died in 1873. Possessed of an extraordinary linguistic faculty, he taught himself Greek, English, Italian, Spanish, Portuguese and German, and in 1823 commenced the study of Chinese under Abel Rémusat. At the end of twelve months he published a Latin translation of the philosopher Mencius. Thenceforth ancient and modern Chinese, Manchu, the Mongolian tongues, and later Sanskrit, were the subjects of exact and profound study. In 1832 he became professor of Chinese at the Collège de France; librarian at the Bibliothèque Nationale, 1839; president of the college, 1855; commander of the Legion of Honor, 1863. His most important work was entitled *Voyages des Pélerins Boudhistes* (Paris, 1853-58).

Juliers. See *Jülich*.

Julius (jö'li-us), the name of three popes.—JULIUS I, born in Rome, chosen pope in 337; died in 352. He summoned a council which approved his conduct in sustaining Athanasius in his contest against the Arians in 342.—JULIUS II (Giuliano della Rovere), was elevated by his uncle Sixtus IV to the rank of a bishop and cardinal, was appointed papal legate to France, in 1503 was elected pope, and died 1513. Immediately on his elevation to the pontificate he planned the complete reëstablishment of the papal sovereignty in its ancient territory, and the extinction of foreign domination and influence in Italy. Refusing to attend the Council of Pisa convened by the King of France, he in 1511 formed the 'Holy League,' to which Spain, England and Switzerland were parties. In 1512 he made open war against Louis XII. The French defeated the papal army near Ravenna, but were soon after driven out of Italy. He is considered one of the most worldly of the popes, but was a far-sighted and patriotic sovereign, and a liberal and judicious patron of art and literature. To get means for building St. Peter's he ordered preaching of indulgences, which was one of the immediate causes of the Reformation.—JULIUS III (Giovanni Maria Giocchi), a Roman of low birth, was made cardinal by Paul III in 1536, took an active part in the Council of Trent as papal legate, was elected pope in 1550, and in the following year reopened the Council of Trent, which had been suspended for upwards of two years. He attempted a union with Nestorians. He died in 1555.

Julius Cæsar. See *Cæsar*.

Jullundur. See *Jalandhar.*

Julus. See *Iulus.*

July (jö-lī′), the seventh month in our calendar, having 31 days. In the Roman year it bore the name of *Quintīlis*, as originally the fifth month. Its change of name to *Julius* was in honor of Julius Cæsar, who was born on the 12th of the month.

Jumilla (*h*ö-mēl′yȧ), a town of Spain, in the province of and 35 miles N. N. W. of Murcia. Pop. 16,446.

Jummoo (jum-mö′), or JAMU, a portion of the state of Cashmere. See *Cashmere.*

Jumna (jum′nȧ), a river of Hindustan, which rises in the Himalayas, in the native state of Garhwal, near Jamnotri, at the height of 10,849 feet. It flows in its upper course in a generally S. W. direction, then bends to the southeastward, and passing the cities of Delhi and Agra falls into the Ganges at Allahabad, after a course of 860 miles. Some trade is carried on by means of clumsy barks. Two important irrigation works—the Jumna Eastern and the Jumna Western Canals, derive their supply of water from this river. The former is 160 miles long, and irrigates about 250,000 acres annually. The latter has a length of 433 miles, and irrigates on an average about 360,000 acres.

Jumnoutri. See *Jamnotri.*

Jumping-deer, the black-tailed deer (*Cervus Lewisii*), found in the United States to the west of the Mississippi.

Jumping-hare (*Pedētes capensis*), a species of jerboa found in Southern Africa, and so named from its general resemblance to a hare, while its jumping mode of progression, necessitated by the elongated nature of the hind legs, have procured for it its specific and popular distinction.

Jumping-mouse (*Meriŏnes hudsonicus*), is found in Labrador and North America generally, but is especially an inhabitant of the fur territories. Like the jumping-hare, it is classified by some along with the jerboas, and is one of the smallest of these forms.

Jumping-rabbit, the alactaga (which see).

Junagarh (jö-nä-gur), a native State of India, in Gujarat, Bombay presidency; area 3283 sq. miles. The surface is generally level, but rises on the Girnar Hills to 3666 feet. The soil is generally good, but irrigation is extensively required. The nawab or ruler pays tribute both to the British government and to the Gaekwar of Baroda. Pop. 395,428. The capital, JUNAGARH, situated under the Girnar and Datar Hills, is one of the most picturesque cities in India, and has recently been greatly improved by the erection of a number of public and other buildings. Pop. 34,251.

Junceæ (jun′se-ē), or JUNCA′CEÆ, the rush order, a small nat. order of endogenous plants, so named from the typical genus *Juncus.* It is principally composed of obscure herbaceous plants with brown or green glumaceous hexandrous flowers, the perianth being in two series, as in Liliaceæ, but calycine instead of petaloid. Some of them, as the common rush, are employed for making mats, chair-bottoms and brooms.

Junction City, a city, capital of Geary County, Kansas. It is on the left bank of Kansas River, 71 miles E. of Topeka. It is an agricultural trade center, and has foundries and other manufactories. Pop. 5598.

Juncus. See *Junceæ* and *Rush.*

June (jön; Lat. *Junius*), the sixth month in our calendar. It consisted originally of twenty-six days, to which it is said Romulus added four, and Numa took away one. Julius Cæsar again lengthened the month to thirty days, and it has ever since remained unaltered.

Juneau (jū′nō), a city, the capital of Alaska, situated on the coast 100 miles N. E. of Sitka. It is a wholesale supply point for Alaska, with mining and fishing interests. It succeeded Sitka as the seat of government in 1908. Pop. 1644.

June-berry, a North American wild tree (*Amelanchier canadensis*) common in Canada and the States, and allied to the medlar. The fruit is pear-shaped, about the size of a large pea, purplish in color, and a good article of food. *Service-berry* and *Shadbush* are other names.

Jung (yung), JOHANN HEINRICH, commonly called *Jung Stilling*, a German writer, was born in 1740, and died in 1817. Poor in his youth, and apprenticed to a tailor, he at length succeeded in studying medicine at Strasburg, where he lived in intimacy with Goethe, and afterwards became a physician at Elberfeld. He was subsequently professor at Heidelberg, then for a number of years at Marburg, and later at Heidelberg

again. He has himself described the greater part of his life in *Heinrich Stilling's Leben* (1806), and *Heinrich Stilling's Alter* (1817). His works dealing with pietistic mysticism are numerous, including *Theobald oder die Schwärmer*, *Das Heimweh*, etc. Much opposition was excited by his strange works on spirits—*Theorie der Geisterkunde* ('Theory of Spirit-knowledge'), and the *Apology* for the same, which is connected with his *Scenen aus dem Geisterreiche* ('Scenes from the Spirit-world').

Jung, Sir Salar, Dewan or Prime Minister of Hyderabad, was born in 1829, and died in 1883. He is chiefly remembered for the energy with which he held in check his native state during the mutiny in 1857-58. When he visited England in 1876 he was knighted in recognition of his valuable services to British rule in India.

Jung-Bahadur, Sir, Prime Minister of Nepal, was born in 1816; died in 1877. His uncle held a high position under the queen, who appointed the nephew commander-in-chief of the army. When the premier was assassinated in 1846 Jung-Bahadur revenged him on his murderers and succeeded as premier. A conspiracy against him was quenched in blood, the king and queen were banished and the heir-apparent was raised to the throne. He aided the British in the mutiny of 1857, and in reward was knighted and given the Grand Cross of the Star of India.

Jung-Breslau. See *Inowraclaw.*

Jungermanniaceæ (jun-gėr-man-i-ā'se-ē), a group of cryptogams closely resembling mosses, usually regarded as a suborder of Hepaticæ, but sometimes classed as a separate natural order. Most of them have distinct leaves. They inhabit the trunks of trees or damp earth, in cool moist climates.

Jungfrau (yụng'frou; 'Maiden'), a mountain of Switzerland, in the Bernese or Helvetic Alps, on the frontiers between the cantons of Bern and Valais, 12 miles S. S. E. Interlaken. It is one of the most magnificent mountains in Switzerland and the loftiest calcareous mountain in Europe; height 13,670 feet. It was first ascended in 1804.

Jungle (jung'gl), properly an Indian term applied to a desert and uncultivated region whether covered with wood and dense vegetation or not, but in English it is applied to land covered with forest trees, thick impenetrable brushwood, or any coarse, rank vegetation.

Jungle-fever, a species of disease prevalent in the East Indies and other tropical regions, a severe variety of remittent fever. It is characterized by the recurrence of paroxysms and of cold and hot stages. The remissions occur usually in the morning and last from eight to twelve hours, the fever being mostly typically developed at night.

Jungle-fowl, a name given to two groups of birds, the one a native of Australia, the other of India, Java, etc. The jungle-fowl of Australia is *Megapodius tumŭlus.* See *Megapodius.* The other birds called jungle-fowl are of the same genus as the domestic fowl, which is believed to be derived from one or other of them. The Indian jungle fowl *Gallus Sonneratti* is abundant in the higher wooded districts of India. It is about equal in size to an ordinary domestic fowl, but more slender and graceful in its form; the colors are rich and beautiful.

Juniata, a borough of Blair County, Pennsylvania, on the Pittsburgh and Ebensburg R. R. Pop. 5285.

Juniata River, a stream in Pennsylvania, formed near the center of the State by the junction of the Little Juniata and Frankstown branch, flowing in a generally E. course and emptying into the Susquehanna 14 miles above Harrisburg. It is about 150 miles long, and though not navigable is noted for its picturesque scenery. Beside it are the Pennsylvania canal and railroad, the latter frequently crossing the stream.

Junin (hö-nēn'), a department of Peru, embracing the wildest parts of the Cordilleras; area about 28,000 sq. miles; pop. 394,393.

Juniper (*Junipĕrus communis*).

Juniper (jö'ni-pėr), the name of hardy exogenous evergreen trees and shrubs of the genus *Junipĕrus*, chiefly natives of the northern parts of the world. They belong to the nat. order Coniferæ, group Gymnospermeæ. About twenty species are known, the most important of which are the *J. communis*, *J. sabīna*, or *savin*, *J. Virginiāna*, and *J. Bermudiāna*. *J. communis*, or common juniper,

is a common bush growing wild in all the northern parts of Europe. The berries require two years to come to maturity, when they assume a bluish-black c lor. They are used extensively in Holland in the preparation of gin, which owes its characteristic flavor to them. They yield an essential oil, which is a powerful diuretic. *J. sabina* or *savin* also yields a powerful diuretic, and an oil which is a local irritant. *J. Virginiāna* and *J. Bermudiāna* are trees. The former is the common red cedar of North America; the latter is known as Bermudas cedar. Both yield a wood used by cabinet-makers, etc., and in the manufacture of pencils.

Junius (jō'ni-us), a signature attached to certain letters on public affairs which first appeared in *The Public Advertiser*, a London paper published by Woodfall, from which they are copied into most of the other journals of the time. The earliest bears date January 21, 1769; the last, January 21, 1772. After they were completed they were collected and published by Woodfall, with a dedication to the English nation and a preface by the author. Other letters bearing the same characteristics, but having different signatures, appeared between April 28, 1767 and May 12, 1772, and are given in the younger Woodfall's edition as the *Miscellaneous Letters*. This edition was published in 1812 in three vols., and included Junius' private letters to Mr. H. S. Woodfall, and a preliminary essay by Dr. J. Mason Good. An enlargement and improved edition was published in Bohn's Standard Library, edited by John Wade, with an essay by the editor in favor of the claims of Sir Philip Francis to the authorship. Although fully a century has elapsed since the publication of these papers, their authorship seems as far from being settled as ever. In seeking for a probable author of these letters the chief difficulty has been to find any one who combined the knowledge, circumstances, distinctive opini ns, and literary skill displayed by Junius. He supported the court party against America, favored triennial parliaments, and opposed the abolition of rotten boroughs. He was evidently well acquainted with court and city politics, the management of public offices, the private intrigues of the time, and if not a lawyer he had considerable knowledge of law. Besides this he seems to have been a man of rank and fortune, for we find him writing to Woodfall; 'I am far above all pecuniary views'; and he expressly asserted that, 'My rank and fortune place me above a common bribe.' With these characteristics and this wide information he united a boldness, vehemence, and rancor which, combined with his epigrammatic and unsparing invective, rendered him an object of terror to those whom he attacked. Public suspicion at the time was fixed most strongly on Burke and Viscount Sackville. But Burke denied the authorship spontaneously to Dr. Johnson, and apart from considerations drawn from his temper, style, and turn of thinking, on several points Burke and Junius were in direct opposition to each other. That Viscount Sackville was the author received considerable belief at the time. His rank, fortune, temper, and talents concur to make it probable, while the friends and enemies of Sackville and Junius coincide. Yet the proof is far from complete in favor of this hypothesis. An attempt was also made to show that Lord Temple was the author, on the ground that the political and personal connections of Junius and Lord Temple were the same, and that his talents, age, circumstances, style of writing and thinking, rendered the hypothesis probable. The opinion that Sir Philip Francis (died 1818) was Junius has been probably the most common. But the internal argument is against the supposition: Francis was but twenty-seven when the first letters were written, and he never displayed before or after any proofs of a capacity or knowledge equal to the compositions of Junius. This opinion was supported by Macaulay; but of his five grounds for ascribing the authorship to Sir Philip Francis, two of them are known to be erroneous suppositions.

Junius, Franciscus, a Dutch scholar, born in 1589, lived for about thirty years in England, then in Holland, and died at Windsor in 1677. Of Anglo-Saxon and the ancient Germanic literatures he had an extensive knowledge; he published a glossary of Gothic, and a work on English etymology (*Etymologicum Anglicanum*), and left a valuable collection of MSS.

Junk, a flat-bottomed ship used in the waters of China and Japan, sometimes reaching 1000 tons. It has a high forecastle and poop, and ordinarily three masts of considerable height, each mast being in one piece, with a lug-sail, generally of bamboo splits. The bow is bluff, the stern full, and there is a very large rudder.

Juno (jō'nō), the most exalted divinity of the Latin races in Italy next to Jupiter, of whom she was the sister and wife; the equivalent of the Greek Herá. She was the queen of heaven, and under the name of Regina (queen) was wor-

shipped in Italy at an early period. She bore the same relation to women that Jupiter did to men. She was regarded as the special protectress of whatever was connected with marriage, and females

Chinese Junks.

from birth to death had her as a tutelary genius. She was also the guardian of the national finances, and a temple, which contained the mint, was erected to her under the name of Juno Monēta on the Capitoline. See also *Hera*.

Junot (zhů-nō), Andoche, Duke of Abrantes, a French marshal, was born in 1771, and died in 1813. He was intended for the bar, but on the outbreak of the revolution joined a volunteer battalion, and soon attracted notice. At the siege of Toulon, in 1793, he became secretary to Napoleon, who afterwards took him with him into Italy and Egypt in the capacity of aide-de-camp. In Egypt he was advanced to the rank of general of brigade. In 1800 he was made commandant of Paris, and he particularly distinguished himself at the battle of Austerlitz in 1805. In 1807 he was sent with an army into Portugal, and made his entry without opposition into Lisbon, his success being rewarded with the title of Duke of Abrantes. On the arrival of the British he first allowed himself to be defeated at Vimeira, and was then obliged to submit to the humiliating convention of Cintra. Although he subsequently took part in the campaigns (1809) against Austria, (1810) against Spain, and (1812) against Russia, he failed to retrieve his reputation. In 1813 he became insane, and lost his life by leaping from a window.

Junta (jun'tȧ; Spanish, an assembly), in Spain, a high council of state. It was originally applied to an irregularly summoned assembly of the states, as distinguished from the Cortes or Parliament regularly called together by the authority of the king.

Jupati Palm (jų-pȧ-tē'; *Raphia tædigĕra*), a palm which grows on the rich alluvial tide-washed soil on the banks of the Lower Amazon and Pará rivers in Brazil. The trunk is only 6 or 8 feet high and 1 foot in diameter. The leaves rise nearly vertically from the trunk, bending out on every side in graceful curves, forming a magnificent plume 70 feet in height and 40 in diameter. Leaves have been measured 48 and 50 feet long, and even these are not the largest. The leaf-stalks, which measure from 12 to 15 feet in length, are used by the natives for a variety of purposes, as for the walls of houses, baskets, boxes, etc. Their rind yields fibrous filaments (*raphi* fiber), which are imported into Europe for agricultural tie-bands, etc.

Jupiter (jö'pi-tėr), or Juppiter, the supreme deity of the Latin races in ancient Italy, the same as the Greek *Zeus*, and the Sanskrit *dyaus*

Jupiter.

(which means the sky); the second part being the same as the Latin *pater*, father. As the supreme deity Jupiter received from the Romans the title of *optimus*

maximus (best greatest), and as the deity presiding over the sky he was considered as the originator of all the changes that took place in the sky. From him accordingly proceeded rain, hail, and the thunderbolt, and he it was that restored serenity to the sky after it had been obscured by clouds. Hence the epithets of Pluvius (rainy), Tonans (thundering), etc., were applied to him. The most celebrated of his temples was that on the Capitoline Hill dedicated to him as Jupiter Optimus Maximus, jointly with Juno and Minerva. He was represented with a scepter as symbolical of his supreme authority. He maintained the sanctity of oaths; he was the guardian of all property; and every Roman was believed to be under his protection, and that of his consort Juno, the queen of heaven. White animals were offered up to him in sacrifice, his priests wore white caps, and his chariot was represented as drawn by four white horses.

Jupiter, is the largest planet of the solar system, and the fifth (excluding the asteroids) in order of distance from the sun. Its mean diameter is about 85,000 miles; its polar diameter about 82,200; its mean distance from the sun 475,692,000 miles; its period of revolution round the sun 11 years 10 1/3 months; its orbit is inclined to the ecliptic at the angle 1° 18′ 40.3″. The inclination of its axis is very small (3° 5′ 30″), so that changes in the seasons must be almost unknown; its volume is 1233 times that of the earth, but its mass is only 300.857 times. Its surface shows belts of dark and light shade, which are usually but not always parallel to each other, undergo quick changes, and seem as though they merged into one another. To account for these rapid changes in its atmosphere it seems reasonable to believe that its interior mass is intensely heated similarly to that of the sun, hence the intense light proceeding from this planet. Jupiter has seven moons, four of large size discovered by Galileo in 1610, and three small ones recently discovered by aid of photography. They appear, like our moon, to make one revolution on their axis while passing once round the planet, the time of one revolution of the 4 large ones being from 1 day 18 hours 27 minutes to 16 days 16 hours 32 minutes. Europa, the smallest of these, has a diameter of 2099 miles; Ganymede, the largest, has a diameter of 3436 miles. Those recently discovered are very much smaller. The moons appear from the earth to move in nearly straight lines from one side of the planet to the other, so that the planes of their orbits are nearly the same as the ecliptic and the orbit of Jupiter; they are eclipsed in the shadow of the planet, and their own shadows may be seen passing over the planet's surface. From observation of the eclipses of Jupiter's satellites Römer discovered that the propagation of light is not instantaneous, and thus calculated its velocity.

Jupiter Ammon. See *Ammon.*

Jupon (jö-pon′), JUPPON, a tight-fitting military garment without sleeves, formerly worn over the armor, and descending just below the hips. It was frequently richly emblazoned and highly ornamented.

Jura (jö′ra), an island of Scotland, one of the inner Hebrides, in the county of Argyle; length 36 miles, mean breadth 7. Its general aspect is exceedingly wild and rugged, and it is chiefly devoted to the rearing of cattle.

Jura (zhü-rà), a department in the east of France, bordering on Switzerland; area, 1938 sq. miles. A large part is covered by the Jura mountains (see next article), and it is drained by the Ain and the Oignon. The pastures are both extensive and rich, and the cattle reared on them, together with their dairy produce (including Gruyère cheese), form the chief source of wealth. Iron is worked, marble and alabaster abound, and there are salt springs in different quarters, from which salt is made. Lons-le-Saulnier is the capital. Pop. 261,288.

Jura a chain of mountains in Central Europe, partly belonging to France, partly to Switzerland, between which they form a sort of natural barrier, extending from southwest to northeast, and exhibiting a number of parallel ridges. The greatest length is some 200 miles, from Belley in France, department of Ain, to the banks of the Rhine; and the greatest breadth about 63 miles, between the Lake of Geneva and the banks of the Doubs. The principal geological formation is the Jura limestone, with greensand, belonging to the lower cretaceous series. Stalactite caves are numerous. The two chief rivers which have their source in the chain are both French—the Ain and the Doubs—and descending from its western slopes, belong to the basin of the Rhone. Its highest points are Crêt de la Neige, Reculet, Mont Tendre and Dôle, the heights of which are respectively 5651, 5645, 5517 and 5514 feet.

Jurassic System (jö-ras′ik), the name given by geologists to what is termed in England the *Oölitic system* of strata, it being very characteristic of the Jura Mountains.

The name is used in a wider sense to include both the Oölite and Lias.

Jurassic Sea-lizard (*Ichthyosaurus communis*).

Jurisprudence (jö-ris-prö′denz), the science of law.—MEDICAL JURISPRUDENCE, another name for forensic medicine (which see).

Jurua (zhü-rü-ä′), a little-known river of Northwestern Brazil, which rises on the borders of Peru and enters the Amazon on the right. Length 700 or 800 miles.

Jury (jö′ri). The origin of trial by jury is not traceable to any single legislator or any particular period. It seems to have had its beginning in certain primitive customs of the northern European races, and received special developments from different nations. By the Anglo-Saxons a person who was accused of crime was permitted to summon twelve of his neighbors, called compurgators, who swore to his innocence. This was the origin of an institution which took settled and vigorous form after the Norman Conquest, gradually developing into its present form.

In criminal trials two juries act, the *grand jury* and the *petit jury*. The *grand jury* may consist of any number more than eleven and less than twenty-four men, who have been summoned by a mandate from the sheriff of the county. Their names are returned on a piece of parchment which is called a *panel*. The oath having been administered, they are usually instructed by the presiding judge in the nature and number of the offenses about to be brought before them. They then proceed to consider in private the statement or *indictment* which is brought against the accused by the prosecution. Should they agree, to the number of twelve, that the accusation has a basis of truth, they bring into court what is called 'a true bill.' If, on the contrary, they find that there is no sufficient foundation for the accusation, they *ignore* the bill, and require the dismissal of the accused. When a true bill is found by the grand jury it usually forms the basis of the subsequent prosecution. The grand juryman is qualified by being a freeholder of his county, to what amount is not clearly defined.

Petty or *petit juries* consist of twelve persons, and no more, for the trial of all criminal offenses, and of all issues of fact in civil cases at the common law. The jury is selected by ballot from those summoned. If all the jurists do not appear, or any of them are justly objected to and set aside, in virtue of the right of challenge exercised by the parties to a suit (see *Challenge*), the deficiency is usually supplied by making a new panel. The jury being then sworn is placed in the jury-box, and the evidence given. No juror is at liberty to leave the box without permission of the Court. Unless the case be a criminal one, in which the prisoner is charged with a misdemeanor, the jury are allowed to go home on engaging not to allow themselves to be spoken to on any subject connected with the trial. When the prisoner is charged with treason or felony the jury are usually allowed to retire only in custody of the sheriff and his officers, who are sworn to keep them together, and not to speak to them with reference to the trial. When the evidence has been led it is usual for the presiding judge to instruct the jury in the points of law which apply to it. It is thus that their duties are divided—the jury dealing with the facts, and the judge with the law of the case. The jury usually form an independent judgment upon the facts, and their finding is considered final. To consider their verdict they usually withdraw to a private room, where no intercourse with other persons is permitted, and where, when the session is protracted, food and other necessaries are supplied. Upon returning into court they publicly assent to such verdict as they have agreed upon. In the United States if they fail to agree among themselves the jurymen are discharged by the judge, and the cause whether civil or criminal can be tried anew, at the pleasure of the court. The jury is an Anglo-Saxon institution and has only recently been adopted by any of the continental nations of Europe. In France the verdict of a majority of the jury is sufficient.

Another kind of jury is the *coroner's jury*, summoned to inquire into cases of sudden or violent death. The inquiry is made in presence of the body, and at the place where the death happened. The jury may consist of any number above eleven, and usually numbers twenty-three; twelve must concur in the finding. Persons found guilty of causing the death are reserved for trial by a petty jury.

Jury-mast, a temporary mast erected in a new ship, or in place of one that has been carried away by tempest, battle, etc.

Jussieu (zhûs-*yeu*), a French family belonging to Lyons, which has

produced a number of distinguished botanists, of whom the following are the principal:—ANTOINE DE, born in 1686; died in 1758.—BERNARD DE, brother of the above, born in 1699; died in 1877.—ANTOINE LAURENT DE, nephew of the above, born in 1748; died in 1836. His work entitled *Genera Plantarum* formed the first complete exposition of the natural system of classifying plants, which has now taken the place of the artificial Linnæan system, His other chief work was *Principes de la Méthode Naturelle des Végétaux.*—ADRIEN DE, son of the preceding, born in 1797; died in 1853. By his researches and publications he placed himself in the front rank of botanists. His best-known work was *Traité Elémentaire de Botanique*, for use in higher-class schools, which far excelled all previous works of the kind.

Juste-milieu (zhûst-mē-ly*eu*), a French expression signifying 'the true mean'; specifically applied to that method of administering government which consists in maintaining itself by moderation and conciliation between the extreme parties on either side.

Justice (jus'tis), a common term for a judge or legal official appointed to hold courts and administer justice, especially given to judges of superior courts. Thus in England the judges in the common law and chancery divisions of the High Court of Justice are so called, the head of the common law division being the lord chief justice of England. The term is similarly used in the Supreme Courts of the United States and the several States. See also *Chief Justice*, and articles below.

Justice, HIGH COURT OF. See *Supreme Court.*

Justice, LORD CHIEF. See *Chief Justice.*

Justice of the Peace, a judicial magistrate entrusted with the conservation of the peace. In Britain the first judicial proceedings are held before him in regard to arresting persons accused of grave offenses; and his jurisdiction extends to trial and adjudication for small offenses. In case of the commission of a crime or a breach of the peace a complaint is made to one of these magistrates. If he is satisfied with the evidence of a commission of some offense, he issues a warrant directed to a constable, tries the party if the offense be within his jurisdiction, and acquits him or awards punishment. The justices meet in petty or quarter session, where offenses of a trivial sort are tried by them, and the statute business of the county is administered. These duties are all performed gratuitously, and not always efficiently, and in recent years there has been an occasional outcry against 'the great unpaid.' Besides qualifications of rank, any person having an estate of £100 per annum free of charge is eligible for the office. In Scotland the duties of a justice of the peace are more limited than in England, at least in practice. A rank or property qualification is not necessary. In Canada there are everywhere justices of the peace, holding their commissions from the crown, as in Britain, and having similar duties within their respective jurisdiction. The same is the case in other British colonies. In the United States the office is held only by special appointment, and the tenure is different in different states; but the commission is usually for three or four years, or some other specific limited period. Their position is similar to that of the justices in Britain. In some of the states they have a right to celebrate marriages.

Justices, LORDS, in Great Britain, persons formerly appointed by the sovereign to act for a time as his substitute in the supreme government, either of the whole kingdom or of a part of it. Thus when George I went abroad in May, 1719, he entrusted the government during his absence to thirteen lords-justices; and nineteen lords-justices and guardians were also appointed when George IV went to Hanover in 1821. The lord-lieutenant of Ireland is a familiar example of a lord-justice.—The title *Lords-justices of Appeal* is in England given to a certain number of judges belonging to the appeal division of the Supreme Court of Judicature.

Justices in Eyre, or ITINERANT JUSTICES, in England, justices who travel about over fixed circuits dispensing justice, the judges of assize in fact. Such itinerant judges were first appointed in 1176; in Magna Charta they were required to visit each county annually.

Justiciary Court (jus-tish'i-a-ri), the supreme criminal court in Scotland, consisting of the lord justice-general (who is the president), the lord justice-clerk, and five commissioners of justiciary, who are also lords of session. The judges go on circuit to three districts, viz.: Jedburgh, Dumfries and Ayr; Glasgow, Inverary and Stirling; and Dundee, Perth, Aberdeen and Inverness. One lord can hold a circuit court, and there is no appeal from his judgment.

Justifiable Homicide. See *Homicide.*

Justification (jus-ti-fi-kā′shun), a theological term employed to designate the act by which a person is accounted just or righteous in the sight of God, or placed in a state of salvation. This conception of God as a judge who absolves the sinner on account of Christ's merit and imputed righteousness is based upon the Pauline writings, and which received its most pronounced expression during the time of the Reformation.

Justin (jus′tin), JUSTI′NUS, the name of two emperors of the East.—JUSTIN I, born in 450; died in 523 A.D., a peasant of Dacia, rose from a common soldier to be commander of the imperial guard, and on the death of Anastasius in 518 became emperor. He relegated the civil administration to the quæstor Proclus, and between them the empire was governed with a fair amount of success.—JUSTIN II ascended the throne on the death of his uncle, Justinian I, in 565. Beset with enemies outside the empire and harassed with internal discord, he in 574 solved his difficulties by abdicating in favor of Tiberius, captain of the guard. He died in 578.

Justin, MARCUS JUSTINIANUS JUSTINUS, a Latin historian, who probably lived at Rome in the second or third century after Christ, although some assign him a later date. He made an epitome of the general history of antiquity by Trogus Pompeius, a native of Gaul, who lived in the time of Augustus, and whose work is no longer extant. This epitome, although incorrect in detail, is valuable for its compressed reproduction of the old histories.

Justinian I, FLAVIUS ANICIUS JUSTINIANUS, surnamed the *Great*, nephew of Justin I, Emperor of the East, celebrated as a lawgiver, was born of an obscure family in 483 A.D., and died in 565. Patronized by his uncle, who, from a Thracian peasant, had become emperor, he so flattered the senate and dazzled the people that he was made consul, and took the title of *Nobilissimus*. On the death of his uncle, with whom he had latterly shared the imperial power, he was proclaimed emperor, and married an actress named Theodora. During his reign the party disputes of the *Greens* and the *Blues* became so violent that in his attempt to quell the tumults the emperor's own life was in jeopardy, and a great part of Constantinople was destroyed by fire. Aided by his generals, he was able subsequently to restore to the Roman empire a part of its former possessions, as when Belisarius in 523 and 529 defeated the Persians, and achieved victories in Africa, and when Narses, another of his generals, put an end to the Ostrogoth rule in Italy. Turning his attention to the laws, Justinian commissioned ten learned civilians to draw up a new code, and the result was the *Corpus Juris Civilis*, or *body of civil law*. This was a work which still remains of great value to the legal world. He took great interest in building cities, fortifications, and churches; among the latter he rebuilt the church of St. Sophia at Constantinople. To maintain his public munificence he oppressed the people with taxes, and suffered his servants to commit the most flagrant crimes. His reign of thirty-eight years was a great period in the empire's history, but the emperor himself was by no means great.

Justin Martyr, an early Christian writer, born in Palestine about 100 A.D., suffered for his faith about 165. Born a heathen but converted to Christianity, he went to Rome, where he wrote an *Apology for Christianity*, with a supplementary or second *Apology*, a *Dialogue with Trypho the Jew*, all still extant, besides other works. He is of importance in the history of Christian dogma.

Jute (jöt), a textile fabric obtained from *Corchŏrus capsulāris*, a plant belonging to the nat. order Tiliaceæ

Jute (*Corchŏrus capsulāris*).

(lime or linden). The jute plant is a native of the warmer parts of India, where its cultivation is carried on, especially in Bengal, on an extensive scale. It is an annual plant, growing to a height of 12 or 14 feet. The fiber forms the inner bark of the plant, and possesses in an eminent degree the tenacity common to the bark of the plants of this order. The fiber is fine, and has a shin-

ing surface; it is injured by exposure to water, and hence is not well adapted for cordage and canvas, but is in extensive use for making bags, and in the United States and Great Britain serves many useful purposes, being mixed with hemp for cordage, and with silk in the manufacture of cheap satins; its principal use is in the manufacture of coarse cloth for bagging, and in making the foundation of inferior carpets, mats, etc. In Bengal, jute has been cultivated and its fibers woven into various fabrics from a remote period, but it is only since about 1830 that its manufacture has risen to importance in Europe. The headquarters of this branch of industry are at Dundee, Scotland. The rice, cotton, sugar, coffee, pepper, and other articles of East Indian commerce are almost wholly carried in gunny bags (as the jute bags are called). large quantities of which are made in and exported from Bengal itself.

Jüterbogk (yü'ter-bok), a town of Prussia, province of Brandenburg, 30 miles s. s. w. of Berlin, with manufactures of woolens, and a church in which is preserved Tetzel's indulgence-box. Pop. 7407.

Jutland (jut'land; Danish, *Jylland*), the peninsular and most important portion of Denmark, surrounded on three sides by the sea—the Skagger Rack, the Kattegat, and the North Sea, on the south by Schleswig; area, 9755 sq. miles. A remarkable feature is the series of inland water-basins known as the Liimfiord, extending from the North Sea to the Kattegat, and finding their chief outlet near Aalborg. The outlet towards the North Sea is sometimes sanded up altogether. The highest point of Jutland is the Himmeljberg, 550 feet above sea-level. Great part of the peninsula is sandy and barren; in the south and east are some low alluvial tracts rich in verdure. There are many lakes and small rivers. The climate on the whole is temperate, but variable. The inhabitants are considered to be the most genuine specimens of the old Danish stock, and have preserved both the language and the manners and customs of early times in their greatest purity. Its earlier inhabitants, the Jutes, took part in the expedition of the Saxons to England. Pop. 1,061,904. See *Denmark*.

Juvenal (jö've-nal)—DECIMUS JUNIUS JUVENALIS—a Latin satirical poet, was born probably about the year 42 A.D. at Aquinum, a Volscian town. He is said to have been the adopted child of a wealthy freedman; to have been by profession a pleader; to have been the friend of Martial; and to have died in Egypt as an exile in charge of a cohort of infantry. Nothing of this is authentic; we only know certainly that he resided in Aquinum and flourished about the end of the first century after Christ. His extant works are sixteen satires, composed in hexameters, and giving in powerful language, inspired by a bitter and heartfelt indignation, a somber picture of the corrupt Roman society of that era. His satires have also been translated by Gifford, and some of them by Dryden, while Johnson's imitations of the third and tenth (under the titles *London*, and the *Vanity of Human Wishes*) are well known.

Juvenile Courts (jö'ven-īl), tribunals for the trial of youthful offenders, who are usually sent to industrial schools or houses of detention, where they receive moral and industrial training. Courts for this purpose began their existence in Chicago in 1899, and have since been established in some form in many cities of the United States and elsewhere. They owe their origin to the growing conception that the methods formerly used of sending youthful delinquents to jail had the tendency to convert them into a class of criminals, while they might be made useful citizens by more judicious and humanitarian treatment. As yet this movement has been most successful in the States of the Mississippi Valley, though the cities of Denver and Boston have been conspicuous examples of success. Judge Lindsey, of the former city, did much to develop the new system of treatment, adopting in 1901 the plan of sending such delinquents to the Industrial School at Golden, Colorado, instead of to the city prison as heretofore. He trusted the young offenders so far as to send them to the school without escort, putting them upon their honor to go there. The result was that out of several hundred sent only five broke their word. A number of the States have adopted this method and New York and others have recently legislated upon the subject. Chicago has a magnificent Juvenile Court building, Philadelphia opened a model House of Detention in 1909, and Milwaukee and St. Louis have similar institutions. Buffalo was the first city in the State of New York to open a Children's Court. As an example of results the work at Chicago may be alluded to. In that city, in ten years, 31,257 children passed through the court, charged with truancy or delinquency of various kinds. The great majority of them were put on probation, and the records show that over 80 per cent. of the boys thus trusted were not brought into

court again. The same can be said for only 55 per cent. of the girls, showing that the treatment of the latter is the more serious problem of the two. The purpose of the houses of detention is the separation of youthful from adult criminals, but only a few cities have so far adopted them. Juvenile Courts have been opened in Canada and Australia and in several English cities, while the subject is under earnest consideration in a number of European countries. Houses of Detention differ from Houses of Refuge, long in existence in certain communities, in being temporary in their purpose, while in the latter unruly and vicious children are brought up under supervision and taught some useful trade.

Juvenile Offenders, is a term legally applied in Britain to young prisoners, as distinct from adult offenders. When the crime is theft, the criminal, if under 16, can be sent to a house of correction for three months or fined in a sum not over £3. Also the law permits a boy under 14 to be whipped with a birch rod to the number of 12 strokes. The magistrate has the power to send the offender, at the end of his imprisonment, to a reformatory for a term of from two to five years. If able, the parents or guardians of such children are often obliged to bear the expense.

Juxon (juks'on), WILLIAM, an English prelate, born in 1582; died in 1663. After studying at St. John's College, Oxford, he became a student of Gray's Inn, with the view of qualifying for the bar, but took orders and obtained livings, first in 1609 at Oxford, and then in 1614 at Somerton. In 1621 he succeeded Laud as president of St. John's College; in 1627 was appointed vice-chancellor of the university, and about the same time chaplain in ordinary to Charles I, who gave him the deanery of Worcester and then the bishopric of London (1633). He had the melancholy privilege of soothing the king's last moments, and ministering to him on the scaffold. His fidelity cost him his bishopric, but at the Restoration he was made Archbishop of Canterbury.

K

K, * the eleventh letter of the English alphabet, representing a guttural articulation, the surd consonant corresponding to the sonant *g*. In Anglo-Saxon this letter was used only occasionally, *c* being regularly used instead. So also in Latin, *k*, borrowed from the Greeks, was little used, its place being supplied by *c*. The Italians, Spaniards and Portuguese have banished the letter entirely from their alphabet. The French use it only in a few words derived from the Greek, foreign proper names, etc. At the beginning of a word or syllable *k* is not pronounced when followed by *n*, as *knife*, *knee*, *know*.

Kaaba (kä'ȧ-bȧ), or CAABA, the sacred shrine at Mecca to which Moslems make their pilgrimages. It is a flat-roofed, quadrangular structure about 40 feet high, 55 feet long and 45 broad, and stands in the center of the mosque or sacred area, which is enclosed by walls and colonnades. At the southeast corner of the Kaaba, built into the wall, is the famous 'black-stone' or *Keblah*, the point to which every pious Moslem directs his face in prayer, and which is devoutly kissed by the pilgrim. According to Mussulman tradition, this was originally of a dazzling white, and was brought from heaven by Gabriel to Abraham when he was erecting the Kaaba. Round the Kaaba are various sacred buildings, and near it the Zem-Zem or holy well.

Kaaden (kä'den), a town in Bohemia, on the Eger. Pop. 7459.

Kaalund (kȧ'lun), HANS WILHELM, a Danish poet, born at Copenhagen, 1818, died, 1885.

Kaap Gold-fields, a district in the Transvaal, intersected by the Kaap River, a tributary of the Crocodile, containing the mining town of Barberton and other settlements.

Kabbala. See *Cabala.*

Kabinda. See *Cabinda.*

Kabul. See *Cabul.*

Kabyles. See *Berbers.*

Kadapa. Same as *Cuddapah.*

Kadi. See *Cadi.*

Kadiak (kȧd'yak), KODIAK, an island south of Alaska, and like it belonging to the United States. The inhabitants, less than 3000 in number, resemble the Eskimos, and live by hunting and fishing, a considerable fur trade being done.

Kadom (kȧ-dom'), an ancient town of Russia, government of Tamboff, on the river Moksha. Pop. 6361.

Kaempfer (kämp'fėr), ENGELBRECHT, a German traveler and physician, born in 1651; died in 1716. As secretary to a Swedish embassy, and afterwards as surgeon in the service of the Dutch East India Company, he traveled extensively in the East. His comprehensive work on Japan, translated from his manuscripts into English in 1727, was, for a very long period, the only reliable source of information about that country.

Kaf. See *Caf.*

Kaffa (kȧf'fa), a mountainous territory to the south of Abyssinia, inhabited by one of the Galla tribes. It is supposed to be the home of the coffee-plant, which grows wild on the slopes of the Kaffa hills. The chief town is Bonga.

Kaffa. See *Feodosia.*

Kaffir-bread, a kind of sago obtained from the stems of one or two plants of the Cycas family, natives of S. Africa.

Kaffir Corn (*Sorghum vulgāre*), a variety of millet cultivated in some parts of Africa.

Kaffir Ox, The Cape buffalo. See *Buffalo.*

Kaffirs (kȧf'fers), KAFFRES, or CAFFRES (from Arabic *Kafir*, infidel or unbeliever), the principal race inhabiting Southeastern Africa, a branch of the great Bantu family. The name

*Where the reader may fail to find articles under *K*, he is referred to *C*.

is now chiefly restricted to the tribes occupying the coast districts between Cape Colony and Delagoa Bay. They differ from the negroes in the shape of the head, it being more like that of Europeans; in the high nose, frizzled hair and brown complexion, which becomes lighter in shade in the tribes of the more southern districts. They are a tall, muscular race, the average height being from 5 ft. 9 in. to 5 ft. 11 in., and frugal and simple in their habits. Their chief occupation is raising and tending cattle and hunting; garden and field work is mainly performed by women. They are of a peaceful disposition, but in times of war they display considerable bravery, tactical skill and dexterity in the handling of their assegais

Kaffir Chief of the Zulu Tribe.

or spears, shields and clubs, as has been shown in their engagements with the British forces. There are several distinct branches or families of Kaffirs; but the tribes which recent events have specially brought to the front are the Pondos, the Fingoes, the Zulus and the Swazi. Kaffirs, especially of the Zulu tribe, are distributed in large numbers over Natal and Cape Colony, and have become to some extent civilized. Frequent hostilities have taken place between the British and one or other of the Kaffir tribes, beginning almost with the first acquisition by Britain of the Cape Colony. The first Kaffir war was in 1811-12, the next in 1818-19. In 1834-35 a serious Kaffir war was carried on, resulting in the expulsion of the Kaffirs beyond the Great Kei, but they were soon allowed to return. Another war (the fourth) broke out in 1846, and lasted nearly two years, with much suffering to both colonists and Kaffirs. Its result was an extension of British territory in the north and east, a portion between the Cape Colony and the Kei being reserved for the natives, and called British Kaffraria. In 1850 a Kaffir outbreak took place, and a bloody war followed, ending in 1853, soon after which British Kaffraria was made a crown colony. A sixth war occurred in 1877-78, owing its origin to disputes between the two tribes of the Fingoes and Gcalekas. For a subsequent war see *Zululand*.

Kaffraria (kăf-frā′ri-a), literally the country of the Kaffirs, a name once applied to a large part of Southeastern Africa, but now limited to the coast district stretching from the Cape Colony to Natal, recently brought under British control. A tract of land southwest of the Kei used to be known as British Kaffraria, but since 1865 it has formed two districts of Cape Colony, namely, King William's Town and East London. See *Kaffirs*.

Kafiristan (kä-fi-ris-tän′), or the country of Kafirs (infidels), a tract northeast of Afghanistan, between India and the Hindu-Kush. It is very mountainous, especially the interior, and inhabited by a nation (the Siaposh) formed of different tribes, varying considerably in complexion. They live chiefly by cattle-raising and agriculture. Although hemmed in by Moslems, they have, excepting a few border tribes, resisted the spread of Islamism. Polygamy is practised, and they dress themselves in goatskins, or fabrics woven from goats' hair, black being the almost universal color.

Kaftan (kaf′tan), or CAFTAN, a long vest or gown worn under a long cloth coat in Turkey, Egypt, Persia and other Eastern countries, tied round the waist with a girdle, and having long sleeves. Formerly the sultan presented state dignitaries and foreign ambassadors with a caftan as a mark of honor.

Kagoshima (kä-gō-shē′mä), a town in Japan, at the southern end of the island of Kiushiu, on the Kagoshima Gulf. It was bombarded by a British squadron in 1863, and set on fire as a punishment for the murder of some British subjects. Pop. 59,001.

Kahau. See *Proboscis Monkey*.

Kaieteur (kī-e-tör′), a waterfall in British Guiana, on the Potaro River, 822 feet high.

Kail. See *Cabbage.*

Kailas (kī-läs′), a sacred mountain of the Hindus in the Himalayas, near the sources of the Indus and Sutlej; height, 20,226 ft.

Kaimacam (kī-mȧ-kȧm′), a Turkish title derived from the Arabic, signifying 'substitute,' and given to the officials who are at the head of the districts called livas, being subdivisions of the vilayets. The lieutenants of the grand-vizier are also thus called.

Kainite (kān′īt), a hydrous sulphate of potash and magnesia, found along with beds of rock salt, especially in Germany and Austria. It is valuable for the production of double sulphate of potash and magnesia, and is used as a manure.

Kainozoic. See *Cainozoic.*

Kaira (kī′ra), a town and district of India, Bombay Presidency. The town is an ancient place with a handsome courthouse, government schools, etc. Pop. 10,392. The district has an area of 1561 sq. miles and a pop. of 716,332.

Kairwan (kīr-wȧn′), a town of Tunis, 80 miles S. S. E. of the capital, in a barren sandy plain, and surrounded by a wall. It ranks second only to Tunis in trade and population, and is one of the holy Mohammedan towns, being formerly almost inaccessible to Christians. Under French rule it has been connected with Tunis by a good road and partly by tramway, and a new water-supply has been introduced. Kairwan was the first seat of Saracenic empire in Barbary, and relics of its ancient grandeur still abound. Pop. about 26.000.

Kaisariah (kī′sȧr-ē′yȧ), or KAISARIYEH, a town in the interior of Asia Minor, vilayet of Angora, south of the Kizil-Irmak, anciently called *Cæsarea.* Pop. est. at 70,000. See also *Cæsarea.*

Kaisar-i-Hind, Hindustani for Empress of India, the title conferred on Queen Victoria in 1876 by an act of Parliament and proclamation at Delhi.

Kaiser (kī′zėr), the German word for emperor, from L. *Cæsar.* This title was revived in 1871, when William III of Prussia became Emperor of Germany.

Kaiak (kā′yak), or KAJAK, an Eskimo boat, used in fishing. It is about 18 feet long and 18 inches wide in center, tapering to the ends, is covered with skins and closed at the top except a hole in the center in which the boatman sits, propelling the boat with a paddle.

Kaiserslautern (kī′zėrz-lou-tėrn), a town in the Bavarian Palatinate, on the Lauter. It has manufactures of woolens, cottons, hosiery, stoneware and leather; breweries, glassworks, paper and other mills, and important ironworks. Pop. 52,306.

Kaiser Wilhelm Land. See *New Guinea.*

Kaithal (kīt-hȧl′), an ancient town of India, Punjab, Karnal district, with manufactures of lace ornaments and toys and saltpeter refineries. Pop. 14,408.

Kakabikka (ka-ka-bik′ka), a cataract in Canada in the Kaministiquia River, just before it enters Lake Superior. It is of notable dimensions, and has a fall of 130 feet.

Kakapo. See *Owl Parrot.*

Kakemonos (kä-ke′mō-nos), a Japanese name for paintings on paper or silk, having a rod at bottom like a map, and hung similarly on a wall.

Kakodyle (kak′o-dīl), or CACODYLE, a compound of hydrocarbon and arsenic, a clear liquid heavier than water, with an insupportably offensive smell and poisonous vapor. Its vapor when mixed with air explodes if heated above 50° C. It is used in medicine as is arsenic. See *Alkarsin.*

Kalabagh (kä-la-bäg′), a town of India, in the Punjab, on the Indus, close to hills and cliffs of solid rock salt, which is extensively quarried. Pop. 5428.

Kaladgi (kȧ-läd′gi), a town of India in the south of Bombay Presidency. Pop. 7024.

Kalafat (kal-a-fat′), a town in Roumania, on the left bank of the Danube, about 1 mile east of Widdin, on the opposite bank. During the Russo-Turkish war of 1853-54 it was twice unsuccessfully attacked by the Russians. Since Roumania has become an independent kingdom it has made rapid progress. Pop. 7113.

Kalahari (kä-la-hä′rē), or KALIHARI, a desert region in Central South Africa, north of the Orange River, a large tract of which is included in the British protectorate of Bechuanaland. It is very flat, subject to long-continued droughts, and has only dried-up river beds; nevertheless, it is not devoid of vegetation, patches of grass and shrubs occurring here and there. An abundant supply of watermelons and some remark-

able varieties of tubers, together with large herds of antelopes and other game, provide ample subsistence to the bushmen and Bakalahari inhabiting this barren region.

Kalahasti (kä-lä-häs′tī), a town of India, Madras Presidency, North Arcot district, with a temple of Siva, which is a place of pilgrimage. Pop. 9935.

Kalakaua I, DAVID, King of Hawaii, born in 1836; died in 1891. He became king in 1874, and in 1887 was compelled to grant a new constitution which much restricted his authority.

Kalamata (ka-la-ma′ta), a seaport of Greece, in the Morea, capital of the government of Messenia, at the head of the Gulf of Koron. It is the seat of an archbishop, and has an export trade in wool, oil, silk and figs. Pop. (1907) 13,123.

Kalamazoo (kal-a-ma-zö′), a city of Michigan, capital of a county of the same name. It is 144 miles E. N. E. of Chicago, situated in a fertile agricultural district, with an extensive celery industry, on a river of the same name, which supplies some of its numerous factories with water power. Paper, harrows, springs and corsets are largely produced, and there are numerous other manufactures. Here is Kalamazoo College (Baptist) and the Michigan Asylum for the Insane. Pop. 39,437.

Kalb, JOHANN, BARON DE, born in Bavaria in 1721; entered the French army as lieutenant in 1743; became captain 1747, and brigadier-general 1761. He was sent on a secret mission to America in 1768, and came again with Lafayette in 1777. He was appointed major-general, and served in New Jersey and Maryland. In April, 1780, he was sent to join the Southern army as second in command to Gates, and on August 16 was mortally wounded at Camden, S. Carolina, dying three days later.

Kale. See *Cabbage.*

Kaleidoscope (ka-lī′dō-skōp), a well-known optical toy invented by Sir David Brewster, by which an infinite variety of symmetrical, and often beautiful, colored designs is obtained. The ordinary kaleidoscope consists of a tube containing two glass plates acting as mirrors, which extend along its whole length and make an angle of 60° with one another. One end of the tube is closed by a metal plate with a small hole at its center, to which the eye is applied; at the other end there are two plates, one of ground the other of clear glass (the latter being next the eye), with a number of pieces of colored glass or beads lying loosely between them. When the eye is applied to the aperture the mirrors produce a beautiful symmetrical figure, and when the tube is turned about or shaken new images, always symmetrical, are formed. This arrangement may be modified in various ways. The instrument has been used by designers of patterns for printed calicoes, etc.

Kalendar. See *Calendar.*

Kali (ka′lē), a Hindu goddess, one of the forms of the consort of Siva, and therefore in some respects corresponding to Durga and other deities. She is represented as black, with four arms, wearing a necklace of skulls, and the hands of slaughtered giants round her waist as a girdle. Her eyebrows and breast appear streaming with the blood of monsters she has slain and devoured. One hand holds a sword, another a human head. She is the goddess of death and destruction, and goats and other animals are sacrificed on her altars. Ancient Hindu books even enjoined human sacrifices to this bloodthirsty goddess. Her worship is said to be characterized by vile secret rites.

Kali (kā′li), a plant, a species of *Salsŏla*, or glasswort, the ashes of which may be used in making glass.

Kâlidâsa (kȧ-li-dȧ′sa), one of the greatest Indian poets and dramatic writers, who lived, according to tradition, in the first century B.C., but some authorities assert that he flourished several centuries after the Christian era. His best production is the drama *Sâkuntala*, which was first translated into English by Sir W. Jones (Calcutta, 1789), and at once aroused in Europe attention to Sanskrit literature. He was also the author of two other plays—*Vikramorvacî* ('The Hero and the Nymph'), and *Mâlavikâ and Agnimitrâ*, while two epics and other works are ascribed to him, some of which have also been made accessible to the general public by translations.

Kalif. See *Caliph.*

Kalihari. See *Kalahari.*

Kalinjar (kā′lin-jär), a village and hill fort of India, N. W. Provinces, Banda district, a place of great antiquity and sanctity, with tanks, caves, temples, tombs, statues, etc.

Kalisch (kā′lish), or KALISZ, a town and province in Russian Poland, near the Prussian frontier. Area of province 4392 square miles, pop. 983,200. The town is of great antiquity, being founded in 655, and was for a long

period the residence of the grand dukes of Poland, whose palace still exists. It is an important trade center, and the capital of the province. Pop. 21,680.

Kalispel, a city in Flathead County, Montana, 98 miles N. by W. of Missoula. Pop. 5549.

Kalium (kal'i-um), another name for potassium, whence its symbol K is derived.

Kalmar. See *Calmar.*

Kalmia (kal'mi-a), a beautiful North American genus of shrubs, with cup-shaped rose or purple flowers disposed in corymbs, and belonging to the natural order Ericaceæ, or heaths. The *K. latifolia*, commonly called *mountain laurel* or *calico bush*, much valued in European gardens for its flowers and foliage, has its home in the Alleghany Mountains. Its trunk sometimes attains a diameter of 3 inches; the wood is very hard, closely resembling box.

Kalmucks (kal'mukz), a nomadic and warlike Mongol race, originally natives of the territory of Central Asia between the Koko-Nor and Tibet, but now inhabiting not only parts of the Chinese empire, but also occupying districts of Siberia and European Russia,

Kalmuck.

where they settled under Russian dominion on the Ural, Don and Volga, and in the government of Simbirsk. They have fought many bloody battles with the Tartars, with the Chinese, and among themselves, and made predatory expeditions as far west as Asia Minor, and as early as the eleventh century. Many of the Russian Kalmucks have been converted to Christianity. They are intrepid soldiers, splendid horsemen, and troops of them are attached to almost every Cossack regiment. Physically the Kalmucks are small of stature, broad-shouldered, with small round heads, and the narrow oblique eyes characteristic of the Mongolian race. They number altogether perhaps 700,000, of whom more than half are under Chinese rule.

Kalocza (kå-lot'shå), a town of Hungary, 67 miles south of Budapest, near the Danube; a Roman Catholic archbishopric with fine cathedral and episcopal palace. Pop. 11,380.

Kalong. See *Fox-bat.*

Kalpi. See *Calpee.*

Kaluga (ka-lö'ga), a town and government of European Russia. The government is bounded by those of Moscow, Smolensk, Tula and Orel, has an area, mostly flat and sandy, of 11,942 square miles and a pop. of 1,287,300. The central parts are covered with immense pine and fir forests, the rest is poorly cultivated, producing chiefly grain, hemp and flax. Iron ore and a poor kind of coal are also raised. The town stands on an elevation on the right bank of the Oka, a navigable river, 114 miles S. W. of Moscow, has rope and canvas factories, and trades largely with Germany in leather, oil and candles. Pop. 49,728.

Kalusz (kä'lụsh), a town of Austria, in Galicia, 60 miles southeast of Lemberg, with natural deposits of potassium salts. Pop. 7821.

Kama (kä'ma), the Hindu god of love, corresponding, generally speaking, to the Greek Eros and Roman Cupid.

Kama or Kamadeva.

He appears as a beautiful youth riding on a parrot, generally carrying a bow with a string formed of bees, and having five arrows, each tipped with a flower that is supposed to have some amorous

influence. Dancing girls or nymphs bear him company, and one carries his banner, the emblem on which is a fish or marine monster on a red ground.

Kama (kä'ma), the largest tributary of the Volga, rises in the Russian government Viatka, and after a course of 1150 miles flows into the Volga, 40 miles south of Kasan. Part of it is navigable for steamers, and ordinary barges can proceed as far as Perm.

Kamaha'meha I, King of the Hawaiian Islands, born about 1753; died in 1819. Chief of one of the islands, he conquered the whole group and became the first king of Hawaii in 1781. Four others of the same title succeeded, Kamehameha III introducing a constitutional form of government in 1840, and Kamehameha V proclaiming a new constitution in 1864. These governmental changes were made under missionary influences.

Kamala (kâm'a-la), a drug long known, under various names, to Indian and Arab physicians, as a specific against the tapeworm, introduced in the British Pharmacopœia in 1864 as a vermifuge, in doses of 30 grains to a quarter of an ounce in syrup or gruel. It occurs as a brick-red powder, adherent to the fruit of the *Rottlĕra tinctoria*, formed by minute, roundish, semitransparent granules, mixed with stellate hairs, and is largely collected in the forests of Madras, where it forms an important source of revenue. The active principle of the powder lies in the 80 per cent. of resin it contains, which also supplies the coloring matter, called *rottlerin*, used as a silk dye. Another variety, exclusively employed as a dye, comes from the east coast of Africa, but differs from the Indian product in the deep purple color, the coarseness of its particles, and the large simple hairs which are found mixed with it.

Kamaon. See *Kumaon.*

Kambaluc. See *Cambaluc.*

Kamenetz (kä'me-nyets), a fortified town of Russia, capital of the government of Podolia, on the Smotritz. Pop. 39,113.

Kames, Lord. See *Home, Henry.*

Kampen (kâm'pen), a town of Holland, on the Yssel, near where it enters the Zuider Zee. It has two interesting churches and a town hall. It was one of the towns belonging to the Hanseatic League, and still has some commercial importance, trading in dairy produce, etc. Pop. 19,664.

Kämpfer. See *Kaempfer.*

Kamptee (käm'tē), or Kamithi, a town of India, Central Provinces, Nagpur district, with an extensive military cantonment, a fine bridge over the Kanhán river, a Protestant and a Roman Catholic church, and a large trade. Pop. 38,888.

Kamptulicon (kamp-tū'li-kon), a floor covering first introduced to the general public in 1862. The best is made of India rubber, gutta-percha and powdered cork. The first two ingredients are liquefied by naphtha or other solvent, the cork-dust is then introduced, and the mixture, while still warm, flattened out by rollers into sheets of the desired length, width and thickness. When hardened, patterns are printed on. It has the advantage of softness and warmth over ordinary oilcloth, and is the best substitute for a carpet; but the cost of the materials used makes its production somewhat expensive, and the cheaper linoleum has now largely superseded it.

Kamrup (käm-röp'), a district of Assam, in the Brahmaputra Valley; area, 3857 sq. miles. Pop. 589,187.

Kamsin (kam'sin), a name in Egypt for the simoom.

Kamchatka (kam-chat'ka), a large peninsula in the north-east of Asia. On the east it has the North Pacific Ocean, and on the west the Sea of Okhotsk; it is upwards of 800 miles in length and 190 in average breadth; square miles, 85,000. It is a Russian possession since 1706. A lofty mountain range extends the whole length of the peninsula. Some of the mountains are active volcanoes, and eruptions are of frequent occurrence. A number of hot springs also exist. The climate is very severe. Excepting in the valley of the Kamchatka River, the most fertile and populous settlement, the soil is but ill adapted for cultivation. The chief wealth of the country lies in its fur-producing animals, including the sable, the Arctic fox, the beaver and the bear. Game and fish of all kinds abound, and form the staple food of the inhabitants. The Kamchadales, once the predominant race of the peninsula, are a branch of the Mongol family, a low type physically and morally; but they are rapidly vanishing before the Russian settlers. In 1886 they were stated to be less than 2000. Their food consists mainly of fish seasoned with whale and seal fat. They believe in a creator and the immortality of the soul (including animals). They use dogs for draught purposes, and not the reindeer,

like their neighbors. The Koryaks are a wandering tribe, living in the northern districts, and subsisting almost exclusively on the produce of the reindeer. The entire pop. is about 7500. The capital, Petropaulovsk, has a pop. of about 1000.

Kamyshin (ka-mi'shin), a town of European Russia, at the juncture of the Kamyshinka and the Volga, in the government and 106 miles s. s. w. of Saratov. It was founded by Peter the Great in the year 1710. Pop. 15,934.

Kanagawa (kä-na-gä'wa), a seaport of Japan, in the island of Hondo, or Niphon, on an inlet of the Bay of Yedo, forming one place of trade with the adjacent Yokohama, open to British trade since 1859. Pop. 12,000. See *Yokohama*.

Kanakas (ka-na'kaz), the native inhabitants of the Sandwich Islands; in New Caledonia and the New Hebrides the name is applied to all the native laborers, without distinction of origin.

Kanara. See *Canara*.

Kanari-oil (ka-na'ri), an oil yielded by the fruits of *Canarium commūne*, a tree of the Indian Archipelago and Southeastern Asia, often called Java almond. The oil is used for culinary purposes and for burning, and is deemed superior to cocoanut oil. See *Canarium*.

Kanaris (kȧ'nȧ-ris), Constantine, a Greek sailor, born in the island of Ipsara about 1790, and who became famous in Europe in 1822 for his daring exploits in firing the Turkish fleets in the Chios and Tenedos Straits. In 1825 he unsuccessfully attempted the destruction of the Turkish fleet in the port of Alexandria, ready to carry Arab troops to Morea. On his return to Greece in 1828, the President, Capodistrias, gave him the command of a fortress and later on that of a squadron; a trust which he amply justified by loyal service at a most critical period. King Otho raised him successively to the rank of captain of the first class, admiral and senator. He was minister of marine in 1846, 1848-49 and 1854-55. In 1862 he took an active part in the overthrow of the government of Otho.

Kanas'ter. See *Canaster*.

Kanauj (ka-nouj'), ancient city of India, 49 miles from Cawnpore.

Kanazawa (kä-na-zä'wa), a town of Japan, near the northwest coast of the island of Hondo (Niphon), with manufactures of silks, porcelain, etc. Pop. (1904) 99,657.

Kanchil, the chevrotain (which see).

Kandahar, or Candahar (kan-da-har'), a town of considerable commercial and strategical importance in the south of Afghanistan, on the direct route to India. It was held by British forces in 1839-42 and 1879-81, and the fortifications have recently been much strengthened. The town lies 3484 feet above the sea, has a large transit trade, and a pop. estimated at from 25,000 to 50,000.

Kandavu (kän-dä-vö'), the southernmost island of the Fiji group. It has a fine natural harbor, with a port of call for steamers, and is surrounded by a number of small islands, called the Kandavu group.

Kandesh. See *Khandesh*.

Kandy. See *Candy*.

Kane (kān), Elisha Kent, a surgeon, traveler and Arctic explorer, born at Philadelphia in 1820; died at Havana in 1857. He was graduated as M.D. at the University of Pennsylvania in 1842, was attached as surgeon to the American mission to China, and afterwards visited India, Egypt and Greece. In 1846 he rendered important service as a volunteer in the United States army in Mexico, in 1850 by his survey of the Gulf of Mexico, and in the same year joined the Grinnell Expedition, as medical and scientific member, in the unsuccessful search for Sir John Franklin. His observations led him to the belief that there was a large open sea near the pole, and with a view to penetrate it he organized and commanded a second expedition, which left New York in the *Advance* in May, 1853. He succeeded in getting as far as 78° 43′ N. lat., where he was frozen up for twenty-one months, and being harassed by scurvy and want of provisions was obliged to abandon the vessel. A perilous journey of 1300 miles in boats and sledges brought him back to Greenland, and he again reached New York in November, 1855. Much broken in health, he sailed for Cuba to recruit, but died there. The accounts of his two expeditions added much to our knowledge of the Arctic regions.

Kane, a borough and summer resort of McKean County, Pennsylvania, 195 miles E. S. E. of Erie. It is in an oil and gas district and has large glass works, wood-working industries, etc. Mushroom growing is a leading industry. Pop. 6626.

Kanem (kä′nem), a district of Central Africa, north and northeast of Lake Tchad, now belonging to Bornu, but formerly an independent state.

Kangaroo (kang-ga-rö′), the common name of a number of animals belonging to the marsupial order of mammals, indigenous to Australia, and first made known to Europe by Captain Cook. The most noticeable feature about the kangaroo is the disproportion between the upper and lower parts of the body. The head is small, deer-like in shape, with large ears; the forelegs small and five-toed; the hindlegs very large and powerful, with four toes only on the feet. The tail is long, thick at the base, and helps to support the animal when sitting erect, the usual posture when not feeding; it also assists the hindlegs in their long leaps (from 10 to 15 feet). The young are born very immature, and protected and nourished for about eight months in the *marsupium*, or pouch, into which the nipples of the mammary glands open. Kangaroos are herbivorous, and, where still plentiful, a serious pest to settlers, whose rifles have, however, considerably reduced their number. The hindquarters of the large species supply a tolerable substitute for venison, while their tails make excellent soup, and their skins good rugs and leather. The kangaroo includes many species, varying in size from a hare to a large sheep, and remains of still larger and extinct species have been found in the pleistocene deposits of Australia. The larger and most common kinds belong to the genus *Macrŏpus*, and include the giant kangaroo (*M. giganteus*), the red kangaroo (*M. rufus*), the brush kangaroo (*M. fruticus*). The tree kangaroos of New Guinea belong to the genus *Dendrogălus;* they have prehensile tails. The rock kangaroos of Northern Australia belong to the genus *Petrogăle.*

Kangaroo.

Kangaroo Apple (*Sŏlānum laciniātum*), a plant of the potato genus, belonging to Australasia and South America, with an edible fruit.

Kangaroo Grass (*Anthistiria Australis*), a tall and valuable fodder-grass of Australia, much liked by cattle.

Kangaroo Island, a long and barren island, area 1671 square miles, situated at the entrance to the St. Vincent Gulf, South Australia, 103 miles from Adelaide.

Kangaroo Rat (*Hypsiprymnus*), or more properly rat-kangaroo, a diminutive species of the kangaroo family, differing from the kangaroo proper in possessing canine teeth in the upper jaw, in its nocturnal habits, and its food, which consists chiefly of roots.

Kangra (kän′gra), a large district of Hindustan, in the Punjab, belonging mainly to the Himalayan chain; area, 9069 square miles. About a ninth is under cultivation, and large tracts are covered with forests. The inhabitants are a good-looking, fair-complexioned race, mild and peaceable, and much attached to their country. Pop. 768.124. Kangra, the capital, had a pop. in 1901 of 4746.

Kanizsa (kän′i-shå), market town of Hungary, district Zala, with large distilleries and fairs for grain, etc. Pop. 23,255.

KANSAS

Scale of Miles
0 10 20 30 40 50

102° A 101° B 100° C 99° D 98° E 97° F 96° G 95° H Longitude West from Greenwich

Kankakee (kan-ka-kē′), a city, capital of Kankakee County, Illinois, 56 miles S. S. W. of Chicago. It is the seat of the Eastern Illinois Hospital for the Insane. There are limestone quarries and manufactures of paper, horseshoe nails, furniture, agricultural implements, etc. Pop. 13,986.

Kano (kä-nō), a town and province of central Africa, Kingdom of Sokoto. Pop. of province est. at 2,250,000.

Kanoje (k*a*-nōj′), or KANAUJ, a town of Hindustan, N. W. Provinces, on a plain near the Ganges. It was once the capital of a great empire, but now consists chiefly of ruins which extend over several miles, though there is also a modern town with some manufactures. Pop. 16,646.

Kansas (kan′zas), one of the United States, bounded north by Nebraska, east by Mississippi, south by Oklahoma, west by Colorado; area, 82,158 square miles. It consists chiefly of undulating plains, well watered by the Kansas, Arkansas and other rivers, the Missouri forming the boundary on the northeast. The soil is generally fertile, highly suitable for grain, vegetables and fruit and cattle-raising is carried on very extensively. Sheep-raising is also attracting much attention, and dairy farming is largely on the increase. The climate is mild, and the winter short, but violent winds and sudden changes of temperature often mar the spring season. Although an agricultural State, Kansas has important and varied manufactures, the rivers supplying the motive power in many places. Slaughtering and meat-packing are important industries and there are extensive products of soap, candles, cheese and condensed milk and an important beet-sugar industry. Bituminous coal, iron ore, lime, marble, lead, zinc, salt, etc., are among the minerals, coal being mined to the extent of over 6,000,000 tons annually. Petroleum and natural gas are also valuable products. Education is well provided for, and there is a State university, an agricultural college, and other colleges and normal schools. It has over 9000 miles of railroad. A law prohibiting the manufacture and importation of intoxicating liquors is in force, and generally observed. The chief towns are Kansas City, Topeka, Wichita, Leavenworth and Atchison, Topeka being the State capital. Kansas originally belonged to the Louisiana territory. Settlers had entered it in considerable numbers by 1853, and in later years it became the scene of a local war between the slave-holding and antislavery settlers. In 1861 it was admitted as one of the States of the Union. Pop. 1,690,949.

Kansas City, in Kansas, on the left bank of the Missouri, opposite the above, is the largest city in the State, and is the seat of immense stock and meat-packing industries, second only to those of Chicago. It has also an extensive grain and flour trade, car and repair shops of seven railroads, and many other industrial establishments. Here is the State Institution for the Blind. Pop. 82,331.

Kansas City, a city of Missouri, on the frontier of Kansas and right bank of the Missouri, in the midst of a rich agricultural region, and forming a center in which fifteen railroads meet, thus making it a great commercial emporium. It is the second largest city of the State, is chiefly built in the sides and top of a steep hill, has various prominent buildings and three fine parks. Several bridges cross the Missouri here. As a live-stock market it is one of the most important in the United States, and it is also a great beef and pork-packing center. It has also a large trade in lumber, fruit, coal, agricultural implements, etc. It is surrounded by an active agricultural and mining region, and has important manufactures. Pop. 248,381.

Kansas River, a river of Kansas, formed by the junction of the Solomon and Smoky Hill, flows in an easterly direction, and falls into the Missouri near Kansas City.

Kansas-Nebraska Bill. The organization of Kansas and Nebraska as territories, in 1854, caused great discussion in Congress. The bill disregarded the Missouri Compromise, and the subject of establishing or excluding slavery was left to the decision of the people of those territories. The struggle to colonize Kansas led to a desperate conflict, in the end the party of freedom prevailing, and Kansas and Nebraska came into the Union as free states.

Kansoo, or KANSU (kän-sö′), an inland province in the north of China; area, 86,608 square miles. It is mountainous, with the Hoang-ho for its principal river, and products of gold, mercury, silks, musk and tobacco. Pop. 1,386,000.

Kant, IMMANUEL, a celebrated German philosopher, the founder of the 'critical' or Kantian philosophy, born at Königsberg, Prussia, in 1724; died there in 1804. He early showed great application to study, and was sent to the Collegium Fredericianum, and then (in 1740)

to the university of his native city. His progress at college and at the university was rapid and brilliant, his studies embracing in particular mathematics and physics, as well as philosophy. Leaving the university after three years, he engaged in tuition, and it was not till 1755 that he took his degree. Soon after this he was appointed one of the teachers in the Königsberg University, and lectured on logic, metaphysics, mathematics and natural philosophy, to which, at subsequent periods, he added natural law, moral philosophy, natural theology and physical geography. In 1770 he became a full professor, obtaining the chair of logic and metaphysics, a post that he occupied till 1797. It is impossible within our space to give anything like an exposition of the philosophy of Kant, which has profoundly influenced all subsequent philosophical speculations. Dissatisfied with the dogmatisms of Wolff and the skep-

Immanuel Kant.

ticism of Hume, he set himself to investigate the field of metaphysics for himself, and in the first place proceeded to the examination of the origin, extent and limits of human knowledge. According to him, part of our knowledge is knowledge *a priori* or original, transcendental and independent of experience; part of it is *a posteriori*, or based on experience. What he calls the 'pure reason' has to do with the former. His great work named the *Kritik der reinen Vernunft*, 'Critique of Pure Reason' (first edition, Riga, 1781), contains the foundation for his whole system of philosophy. In the preface to a later work, the *Kritik der Urtheilskraft*, 'Critique of the Power of Judgment' (Berlin, 1790), he defines 'pure reason' thus: Pure reason is the faculty to understand by *a priori* principles; and the discussion of the possibility of these principles, and the delimitation of this faculty, constitute the critique of pure reason. In the first rank of such ideas as we do not derive from experience are *space* and *time*. Kant shows that all our perceptions are submitted to these two *forms*, hence he concludes that they are within us, and not in the objects; they are *necessary* and *pure intuitions* of the internal sense. The three original faculties, through the medium of which we acquire knowledge, are *sense*, *understanding*, *reason*. Sense, a passive and receptive faculty, has, as already stated, for its forms or conditions *space* and *time*. Understanding is an active or spontaneous faculty, and consists in the power of forming conceptions according to such categories as unity, plurality, causality, etc., which categories are applied to objects of experience through the medium of the two forms of perception, *space* and *time*. Reason is the third or highest degree of mental spontaneity, and consists in the power of forming ideas. As it is the province of the understanding to form the intuitions of sense into conceptions, so it is the business of reason to form conceptions into ideas. Far from rejecting experience, Kant considers the work of all our life but the action of our innate faculties on the conceptions which come to us from without. He proceeds in a similar way with morality; the idea of good and bad is a necessary condition, an original basis of moral, which is supposed in every one of our moral reflections, and not obtained by experience. He treats this part of his philosophy in his *Kritik der praktischen Vernunft*—'Critique of Practical Reason' (1788).

Kanuri (kä-nö′ri), or KANORI, a Soudanese people, who form the principal portion of the population of Bornu.

Kaolin (kā′u-lin), a name first given by the Chinese to a pure white clay used by them in the manufacture of porcelain. Kaolin is the result of the decomposition of granitic rock, containing felspar, mica and quartz. Similar clays, differing slightly in color and in the percentage of constituents, are found at Schneeberg in Saxony, furnishing the material of Dresden china; at Limoges, in France, employed for Limoges ware; and at St. Austell, in Cornwall, the source of supply for the British potteries. It is also found in enormous deposits in many parts of the United States, and is largely employed in pottery manufacture at Trenton, New Jersey, and East Liverpool, Ohio. In its natural state kaolin somewhat resembles mortar; by sorting and repeated filtration it is freed from all coarse ingredients, then dried in pans and sheds, and sent into the market cut into blocks.

Kapunda (ka-pun′da), a town in South Australia, 49 miles N. of Adelaide, famous for its copper mines. There are also quarries of fine marble. Pop. 1805.

Kapurthala (ka-pört′ha-la), a native state of India, province Punjab, between the Beas and the Sutlej rivers; area 598 square miles, pop. 314,341. The capital, Kapurthala, lies 65 miles east of Lahore and 8 miles from the left bank of the Beas. Pop. 18,519.

Karachi (ka-rä′chē). See *Kurrachee*.

Karaites (ka′rīts), a Jewish sect, founded about the middle of the eighth century by Anan Ben David, and which was for a long time the object of persecution by the orthodox Jews. They refuse to accept as divine or authoritative the traditions and doctrines of the Talmud, or those in the rabbinical writings, and adhere closely to the text and letter of the Old Testament. The sect never became very important, although thinly spread over many eastern countries. They are still found in Poland, Galicia, Alexandria and Constantinople; but their chief force is in the Crimea, where some thousands are said to exist.

Karakorum (kä-rä-kō′rum), a name sometimes given to the mountain range in Central Asia forming a sort of rampart between Cashmere and Eastern Turkestan, and forming the watershed between the Indus basin and that of the Tarim. The name is also given to a pass in this range, 18,000 feet above sea-level, on the direct road from India to Eastern Turkestan.

Karaman (kä-rä-män′), a town of Asiatic Turkey, in the pashalic of Karamania, in the valley of the Taurus chain, formerly the residence of the pasha. Pop. 8000.

Karamania, or CARAMANIA (kä-rä-mä′nē-ä), a vilayet of Asiatic Turkey, in Asia Minor. It is traversed from east to west by the Taurus range, covered with oak and pine forests, and watered by the Kizil-Irmak, the Syhoon, and other lesser rivers. The climate is genial, the soil rich, producing abundant harvests, and the vine and the fig grow in profusion. The chief occupation of the inhabitants, mostly Turkish, is the rearing of live stock. The capital is Konieh.

Karamsin (kå-råm′zēn), NICOLAI MICHAILOVICH, imperial Russian historiographer, born in a village of the government of Orenburg in 1765; died at St. Petersburg in 1826. He received a desultory education at a private school in Moscow, but made up the deficiency by extensive reading and continual travel. In 1792 he founded the Moscow *Journal*, and in subsequent years several literary periodicals. He did much to purify his native language, and gave a fresh impetus to Russian literature. His title to fame rests on his *History of the Russian Empire* (12 vols., St. Petersburg, 1816-24), a work written in fine style, with impartiality and penetration, and translated into several other languages, including English.

Kara-Su-Bazar (kå-rå-sö-bå-zar′), a Russian town in the Crimea, formerly a very important market, but its commerce is declining. Pop. 12,961.

Karatchef (kä-rät-chef′), a town of Russia, government of Orel. Pop. 15,605.

Karauli (ka-rou′lē), a town of India, in Rajputána, capital of native state of same name, surrounded by walls and a moat, and containing a palace, handsome temples, etc. Pop. 23,482. The state, which is under the superintendence of the Bhurtpore and Karauli Agency, has an area of 1208 square miles, and a pop. of 156,786.

Karens (kä′renz), a pagan tribe of Burmah, formerly confined to a region beyond the Salween River, called Karen-ni, on the borders of Burmah and Siam, but now distributed over various parts of Burmah. They are an intelligent and industrious race, many of them having become Christianized, chiefly through the agency of American missionaries. They are estimated at about 100,000, but the Karen dialect is stated to be spoken by six times that number.

Karikal (kä-rē-käl′), or CARICAL, a small French settlement in India, in the Carnatic, on the Coromandel coast, 150 miles S. of Madras. Area, 62 square miles; pop. 56,595.—KARIKAL, the capital, on the Cavery delta, has a pop. of 18,038, and a large export trade, chiefly in rice.

Karli (kär′lē), a celebrated Buddhist cave-temple of India, Poonah district of Bombay Presidency. It is rich in sculpture, and is divided, like a church, into nave and aisles, with an apse.

Karma (kär′ma), a Sanskrit word signifying the Brahministic conception of the future state of mankind. It expressed the whole of the actions, good and bad, which determine the soul's destiny. It was borrowed by the Buddhists and developed into an elaborate ethical speculation, the cause which influences every action or event; the sum

of all merits and demerits. It arises from ignorance and may be overcome by right living and right thinking, the ultimate state being that known as Nirvana. See *Buddhism.*

Karlsbad, Karlsruhe, Karlstadt. See *Carlsbad,* etc.

Cave at Karli.

Karmathians (kär-mā'thi-anz), once a powerful Mohammedan sect, founded in Irak by Hamdan Karmat during the ninth century, who adopted the doctrines of the Ismailis, and introduced communism among his rapidly increasing flock. Missionaries were trained to spread his creed, and one of them, Abu Saïd, gained a strong hold on the people of the Persian Gulf. The caliph, afraid of the influence of the new sect, sent an army for its suppression, but he was defeated, and Abu Saïd took possession of the whole country. His son Abu Tahir, who succeeded him, made further conquests, and became master of almost all Arabia, Syria and Irak; but under his successors this power rapidly declined, and was finally broken towards the end of the tenth century.

Karnak. See *Thebes.*

Karnal (kar-näl'), an Indian town and district, in the Punjab; area of district, 2396 square miles; pop. 883,225.—KARNAL, the headquarters of the district, trades largely with Delhi and Umballa. Pop. 23,559.

Karnul, or KARNOOL (kar-nöl'), a town in India, in the presidency of Madras, situated in the fork formed by the junction of the Hundri with the Tungabhadra, with a dismantled fort. Pop. 25,376. The district has an area of 7788 square miles; a pop. of 818,000.

Karr, JEAN BAPTISTE ALPHONSE, a French journalist and romance writer, born in 1808, and educated at the Collège Bourbon, Paris. In 1832 appeared his first novel, *Sous les Tilleuls,* originally written in verse, and which at once brought him into notice. Numerous other works followed in rapid succession, and he also contributed largely to journals and reviews, including the *Revue des Deux Mondes.* In 1835 he became editor of the *Figaro,* and in 1839 commenced in it the fortnightly *Guêpes* ('Wasps'), a publication which attracted much attention for a time by its witty and humorous anecdotes and character sketches, and brought him considerable profit and much ill-will. In 1855 he retired to Nice, where he finally became an enthusiastic grower of fruit and flowers. Died in 1890. His daughter, THÉRÈSE KARR, has published several works.

Karri (kar'i), a valuable timber largely exported from Western Australia to Europe and America, and obtaned from an enormous tree belonging to the Eucalyptus family.

Karroos (kar'rös), the name given in South Africa to the elevated tablelands, 3000 to 4000 feet above sea-level, lying between the mountain ranges. The soil is shallow but rich, and during the rainy season, or when artificially watered, vegetation is most profuse. The Karroos form excellent pasturage for cattle, sheep and Angora goats; and great tracts are now occupied as farms, the uncertain rainfall being supplemented by permanent springs and large reservoirs. The 'Great Karroo,' in Cape Colony, extends from east to west for 300 miles, with a breadth of 70 miles.

Kars (kärs), a town on the Russo-Turkish frontier in Asia, formerly a Turkish fortress, and the scene of several gallant defenses. Captured and annexed by the Russians in November, 1878, it has become the capital of a Russian province of the same name; area, 7308 square miles, pop. 349,100. It has since been connected with Batoum and Tiflis by military roads, and the fortifications have been much enlarged and strengthened. Pop. 20,891.

Karst (kärst), a mountain or elevated region of Austria, northeast of the Adriatic, in the Coast Lands, Carniola, Croatia and Dalmatia.

Kartarpur (kar'tär-pör), a town of India, Punjab, heredi-

tary residence of the *guru* or high priest of the Sikhs. Pop. 10,840.

Kartikeya (kär-ti-kā′ya), the Hindu god of war. He is represented riding on a peacock, with six heads and twelve hands, in which numerous weapons are brandished.

Karun (ka-rön′), a navigable river of Southwestern Persia, falling into the Shatt-el-Arab, or joint stream of the Euphrates and Tigris. It has recently been opened to foreign trade as far as Ahwaz.

Karwar (kär-wär′), a seaport of India, Bombay Presidency, with a safe harbor and a good trade. Pop. 16,847.

Kasbin. See *Kazvin.*

Kaschau (kä-shou′), a town of Hungary, capital of the county of Abaujvar. It is beautifully situated, surrounded by vineyards, and one of the best-built towns in Hungary. Pop. 40,102.

Kasganj (käs-zanj′), a town of India, N. W. Provinces; well built, with a good trade in grain and sugar. Pop. 19,686.

Kashan (kä-shän′), a town of Persia, province of Irak-Ajemi, in a fertile plain 90 miles south from Ispahan. It is regularly built, has many fine mosques, etc., and its silks, carpets, jewelry, etc., are much esteemed. Pop. 35,000.

Kashgar (käsh-gär′), a Chinese town of Central Asia, in Eastern Turkestan, on a river of the same name, with considerable manufactures of cotton, linen, gold and silver cloths, carpets, etc., and an extensive trade, its position at the junction of several great routes making it the emporium of much of the commerce of Central Asia. Pop. estimated about 60,000.

Kashkar (käsh-kär′; *Ovis Polii*), a large species of sheep inhabiting the lofty plateaus of Central Asia. The male has very large horns bent circularly, while the female has horns resembling those of a goat.

Kashmir (kash-mēr′). See *Cashmere.*

Kasipur (kä′sē-pör), a town of India, N. W. Provinces, a great place of Hindu pilgrimage. Pop. 14,667.

Kassai (kas-sē′), a river of Southern Africa, a tributary of the Sankulla, and thus belonging to the Congo system.

Kassala (kas-sä′la), a town in Nubia, on the Mareb, a tributary of the Nile, 250 miles east of Khartoum, and about the same distance west of Massowah. It was formerly a place of importance, but has greatly declined since the rising of the mahdi. Pop. 20,000.

Kassel. See *Cassel.*

Kassimof (käs-si-mof′), a town of Russia, in the government of and 70 miles E. N. E. of Riazan, on the Oka. It has a large trade, and carries on tanning, boot and shoe manufacture, etc. Pop. 13,545.

Kastamuni (käs-tä-mö′nĕ), a town of Asia Minor, capital of the Turkish vilayet of its own name, 100 miles N. N. E. of Angora, with manufactures of printed cottons and copperwares, dye-works, etc., and a trade in Angora-goats' hair. Pop. estimated at 16,000.

Kasur (ka-sör′), a town of India, Lahore district, Punjab, with manufactures of leather and a good trade. Pop. 22,022.

Kater (kā′ter), HENRY, an English writer on physics, born at Bristol in 1777; died in London 1835. He joined the Indian army, gained the rank of captain, and rendered great service by his trigonometrical surveys. His health compelled him to retire on half-pay in 1814, and henceforth he devoted his time to scientific pursuits; the seconds pendulum, terrestrial gravity, and standard measures commanding his chief attention.

Kathmandu. See *Khatmandu.*

Katrine (kat′rin), LOCH, a picturesque and much-frequented lake, Scotland, county of Perth, 5 miles east of Loch Lomond; 10 miles long, in some places 2 miles broad, encircled by lofty mountains and rocky ravines clothed with trees. At its east end is the celebrated pass of the Trossachs, rendered famous by Scott's *Lady of the Lake.* Through this pass a stream flows, carrying the surplus waters of the lake to Loch Achray. The water-supply to the city of Glasgow is drawn from Loch Katrine.

Kattywar, or KATHIAWAR (kät-hi-ä-wär′), a peninsula of Hindustan, Bombay Presidency, between the Gulf of Cambay and the Runn of Cutch. Most of it is occupied by the Kattywar Agency, formed by numerous small native states of Guzerat, many of which are tributaries to the British government, to the Gaekwar of Baroda, or to the Nawab of Junagárh. The surface is generally undulating, the soil sandy and productive only where irrigated. Cotton is the principal crop. Area about 22,000 square miles. Pop. 2,752,000.

Katwijk (kät′wīk), a place on the coast of Holland, near where the Rhine enters the sea by means of

sluices, now much frequented for sea-bathing.

Katydid (kā'ti-did; *Platyphyllum concavum*), a species of grasshopper of a pale green color, body about an inch long, found in many parts of the United States, and so named from the sound of its note. This is produced by the friction of the taborets in the triangular overlapping portion of each wing-cover against the other, and is strengthened by the escape of air from the sacs of the body, so as to be heard on a quiet night at a quarter of a mile distance. The females are noiseless.

Katzbach (kåts'bå*h*), a small river of Prussia, in Silesia, passing near Liegnitz, famous for the important and decisive victory which the Prussians under Blücher gained, August 26, 1813, over the French under Macdonald.

Kauai (kou'ī), the most northwesterly island of the Sandwich group, 64 miles W. N. W. of Oahu, and 590 sq. miles in area. It is of volcanic formation, its extreme altitude being 6000 feet. Its soil is in places very productive, yielding coffee, rice and sugar. Pop. 20,734.

Kaufmann (kouf'man), MARIE ANGELICA, a distinguished painter, born at Coire, Switzerland, in 1741; died at Rome in 1807. She received instruction in drawing and painting from her father, himself a painter, and before the age of twenty she had become famous. The study of the Italian masters perfected her style, and while at Venice she was induced to go to London (in 1765), where she had a very successful career. Sir Joshua Reynolds is said to have been in love with her, but she married a Swedish adventurer calling himself Count Horn, from whom she afterwards obtained a divorce. In 1781 she married a Venetian landscape painter named Zucchi, returned the following year to Italy, and finally settled in Rome. She is at her best in ideal figures, her faces are tender and elevating, her grouping and draping excellent, but her design often lacks energy and firmness, while her coloring is rather too brilliant. She was one of the original members of the Royal Academy.

Kaukauna (ka-kạ'na), a city of Outagamie County, Wisconsin, on the Fox River, 7 miles N. E. of Appleton. Paper, pulp, leather, etc., are manufactured. Pop. 5115.

Kaulbach (koul'bå*h*), WILHELM VON, one of the greatest of modern German painters, born at Arolsen, Waldeck, in 1805; died at Munich of cholera in 1874. He studied at the art academy of Düsseldorf under Cornelius, whom he assisted in the execution of the frescoes of the Glyptothek or gallery at Munich, and subsequently succeeded in the Munich Academy. The desire of King Ludwig of Bavaria to make Munich the center of German art afforded free scope for his genius, and he was long engaged in the decoration of the Hofgarten, the Odeon, the palaces of Maximilian and Ludwig, and the new Pinacothek, for which he did the series of designs of contemporary groups of artists, architects, etc., executed in fresco on the exterior. His most ambitious pictures, with the exception of the *Madhouse* (1828), are to be found in a series (utilized in the decoration of the Berlin Museum) seeking to depict the progress of the human race in typical scenes from the great historic periods, and comprising the *Tower of Babel, Age of Homer, Destruction of Jerusalem, Battle of the Huns and Romans, The Crusades* and *The Reformation* (1834-63). Besides these, however, he left a large number of portraits, designs and illustrations of books, including the *Reineke Fuchs*, the Gospels, and the works of Shakespere, Goethe and Schiller. As a colorist he was of inferior rank, his main strength lying in form and composition. In choice and handling of themes he showed the width of range of a mind of very high order, essaying with exceptional success all styles of his art from Michael Angelo to Hogarth; but the artistic value of his work is often lessened by a tendency to symbolism and allegory, and a too obvious straining after an idea. He belongs in the class or stands in the transition from the idealism of Cornelius to the more realistic schools of modern historical painters.

Wilhelm von Kaulbach.

Kauri Pine (kou'ri), (*Dammăra Australĭlis*), a tree peculiar to New Zealand, and found there only at the northern extremity of the North Island. It reaches the height of 150 feet, and its timber is much valued for building purposes, for making furniture, etc., but unfortunately the supply is not likely to hold out long. The resin of this tree, the kauri gum, forms a valuable export, and is used in making fine varnish, etc. Most of it is obtained in a fossil state, by digging.

Kava. See *Ava-ava.*

Kavanagh (kav'a-nȧ), Julia, a British novelist, born at Thurles (Tipperary) in 1824; died at Nice, in 1877. She was educated and lived much in Paris. *Madelcine, Natalie* and *Daisy Burns* are some of her best novels, while *Women in France of the Eighteenth Century* is an excellent biographical work.

Kaveri. See *Cavery.*

Kaye (kā), Sir John William, an English writer, born in 1814; died in 1876. He was educated at Eton and Addiscombe Military College, served as an officer in India until 1841, entered the civil service of the East India Company in London 1856, and became a secretary at the India office in the following year. He was a shrewd observer, and made good use of his Indian, military and official experience in the production of many historical and biographical works, chief among which are his *Histories of Afghanistan*, of the *East India Company* and of the *Sepoy War.*

Kazan (ka-zän'), a city of European Russia, capital of the gov. of same name, situated on the Kasanka, about 4 miles above its junction with the Volga. It is an extensive city, strongly fortified, with large wool-combing, weaving and dyeing establishments, tanneries and soapworks, and a government dockyard in its vicinity. The timber, flour and hemp fairs of Kazan are of the largest in the Russian Empire. The university is a great seat for oriental learning, with nearly 1000 students. Pop. 143,707.—The government is surrounded by the governments of Viatka, Orenburg, Nijni-Novgorod and Simbirsk; area, 24,600; pop. 2,504,400. It is well watered by the Volga, the Kama, the Sura, the Viatka, the Kasanka; the climate is temperate; agriculture, cattle-raising and fishing are the chief occupations.

Kazanlik (ka-san-lik'), a town of Eastern Roumelia, at the foot of the Balkans. It is noted for its manufacture of attar of roses. The valley of the river Qunja, near by, is a vast garden of roses. Pop. 10,765.

Kazvin (käz'vēn), a town of Persia, prov. Irak-Ajemi, 90 miles northwest of Teheran. It has been greatly devastated by earthquakes, but has still a considerable trade. Pop. about 50,000.

Kea (kē'a), a genus of parrots (*Nastor*) of New Zealand, of which only three species are known. *N. notabilis*, formerly a vegetable and insect eater, began to feed on offal after the introduction of sheep, and later developed the habit of attacking live sheep, worrying weak ones to death, after which they devour the kidney fat.

Kean (kēn), Charles John, actor, son of the celebrated Edmund Kean, born at Waterford in 1811; died at London in 1868. He was educated at Eton, but being thrown on his own resources in 1827 he took to the stage, and made his *dĕbut* at Drury Lane as *Young Norval.* In 1830 he visited America, established his reputation, and reappeared as a leading actor in London in 1838, among his parts being *Hamlet* and *Richard III.* He married the accomplished actress Ellen Tree in 1842, revisited the United States in 1845, and in 1851 became sole lessee of the Princess Theater, London, where he put some of Shakespere's plays on the stage with a splendor never before attempted. In 1863 he made a tour of Australia, California, Jamaica, the United States, Canada, etc., which proved a great financial success. On his return he continued to play in London and the provinces until a short time before his death. He inherited little of his father's genius, and his success was largely due to effective staging.

Kean, Edmund, the most brilliant tragic actor of his age, born at London in 1787 or 1789; died at Richmond, in 1833. His parents were poor and connected in a low capacity with the theatrical profession. At two years of age he was placed in a pantomime, at seven he went to school, but ran away, and for a short time he was a cabin boy in a vessel. Returning to the boards, he ultimately obtained an engagement at one of the minor London theaters. When not yet thirteen years of age he managed to please his country audiences as *Hamlet, Cato*, etc., and in Windsor he gained the applause of the royal family in *Richard III.* In 1814 he appeared at Drury Lane as *Shyloek* and *Richard III.* His success was sudden and unexampled, and was equally great in other parts, including *Othello, Hamlet, Macbeth, Iago, Lear*, etc.

Kearney (kär'ni), a city, capital of Buffalo County, Nebraska, 195 miles w. of Omaha. It has a State industrial school, a military academy, etc., has excellent water power and various industries, and is an important shipping point for grain. Pop. 6202.

Kearny, a town of Hudson County, New Jersey, on the Passaic River, opposite Newark. Has manufactures of yarn, linoleum, chemicals, small metal goods, wire, etc. Pop. 18,659.

Kearny, PHILIP, soldier, was born at New York City in 1815. In 1839 he served in the French army with distinguished gallantry, as also through the Mexican war; afterward participating in the war in Italy in 1859. In the Civil war his daring courage manifested itself. He was killed in the engagement at Chantilly, September 1, 1862.

Kearny, STEPHEN WATTS, soldier, an uncle of the preceding, was born at Newark, New Jersey, in 1794; died in 1848. Entering the army as lieutenant in 1812, he distinguished himself at Queenstown. In 1846, during the Mexican war, he led an army to New Mexico and conquered that province. In 1847 he was for a time governor of California.

Kearsarge (kēr'särj), the name of two mountains, of New Hampshire, one in Carroll County, 3250 feet high, the other in Merrimac County, 2950 feet high. The name was given to one of the warships of the Civil war, the only one that took part on the Union side in an ocean battle, its opponent being the Confederate privateer *Alabama*. The fight took place on the coast of Cherbourg, France, June 10, 1864, and ended in the sinking of the *Alabama*, its officers and crew being rescued. The *Kearsarge* was wrecked on a reef in the Caribbean Sea in 1894, and its name was transferred to a steel-clad battleship of the United States navy, launched in 1898. This is the only American battleship which does not bear the name of one of the States.

Keats (kētz), JOHN, an English poet, was the son of a livery-stable proprietor, and was born at London in 1795; died at Rome in 1821. In 1803-09 he was at a school at Enfield, after which he was apprenticed to a surgeon. This profession was not congenial, and he got his indentures canceled, but continued his medical training at Guy's Hospital till about 1817. He now devoted himself entirely to literature, having as friends or acquaintances Leigh Hunt, Shelley, and other distinguished authors. His first volume of poems came out in 1817. *Endymion, a Poetic Romance*, appeared in 1818; his last volume of poetry, containing *Lamina, Isabella, The Eve of St. Agnes, Hyperion*, and other poems in 1820. By this time he had become so ill of consumption (which had also afflicted his mother) that he was advised to seek a warmer climate; but it was too late, and though he reached Rome he only survived a short time. Shelley honored his memory by his elegy *Adonais*. Keats charms by his love of nature, his keen, sensuous perception, and his sweet harmony; but his beautiful thoughts are often hidden by wild fancies, while errors of taste and faults of diction abound in his poetry. But his later works are free of many of the faults of the earlier productions, and place him in the front rank of the poets of his age.

Kebla. See *Kaaba*.

Keble (kē'bl), JOHN, an English divine and poet, born in 1792; died in 1866. He gained his bachelor's degree at Oxford University, 1810, where he became afterwards public examiner and professor of poetry. In 1835 he obtained the living of Hursley, near Winchester, which he held until his death. As a zealous high churchman he was associated with Newman and Pusey in getting up the famous *Tracts for the Times* (1833). His reputation is chiefly due to his well-known volume of hymns, *The Christian Year*. He also wrote *Lyra Innocentium*, a series of poems on children, *Sermons*, etc. Keble College, Oxford, was established in honor of his memory.

Kecskemét (kech'ke-met), one of the largest market towns of Hungary, 50 miles southeast of Budapest. It has an extensive trade in horses and cattle, and much-frequented fairs. Pop. 56,786.

Kedge (kedj), a small anchor used to keep a ship steady and clear from her bower anchor, while she rides in a harbor or river, also in removing her from one part of a harbor to another. See *Anchor*.

Keel (kēl), the bottom timber in a wooden vessel which forms the main support and connection of the whole fabric. It is generally composed of several thick pieces of timber placed lengthways, scarfed and bolted together. A piece bolted to the bottom of the keel is called the *false keel*, and an internal piece, also bolted to the keel, is called the *keelson*. In iron vessels the arrangement of parts is altogether different.

Keelhauling, a mode of punishment in the British navy in the seventeenth and eighteenth centuries.

The culprit was suspended from a yard-arm, then dropped into the water and hauled under the keel up to the yard-arm on the other side. On small fore-and-aft vessels he was let down at the bows and drawn aft by a hauling line under the keel to the stern.

Keeling Islands (kēl'ing), or COCOS ISLANDS, a small group of coral islands in the Indian Ocean, south of Sumatra, discovered by William Keeling in 1609, belonging to Britain, and since 1885 a dependency of the Straits Settlements; area about 9 square miles, pop. about 500, partly consisting of members of a family of the name of Ross, who manage all the affairs of the islands, but chiefly of Malays born on the islands, and a smaller number of imported Java coolies. The islands form a sort of horseshoe, enclosing a lagoon. They are all thickly planted with cocoanuts, which form the principal product. Rice is the chief import. The sea teems with fish, which are largely caught. Poultry, sheep and rabbits have been introduced.

Keen, WILLIAM W., an eminent surgeon, born at Philadelphia, Pennsylvania, in 1837. He was graduated at Jefferson Medical College, was assistant surgeon to a Massachusetts regiment in 1861, and afterwards acting assistant surgeon in the U. S. army. His studies were devoted to the surgery of the nervous system and he was a pioneer in cerebral surgery. In 1891 he proposed relieving spasmodic wryneck by the excision of the nerves concerned. He also experimented in the injection of filtered air to determine rupture of the bladder.

Keene, LAURA, actress, born in England in 1820, came to the United States in 1852, and made this country her home until her death in 1873. She became popular as an actress and manager, being manager of the Varieties Theater in New York and afterwards of the Olympic, known also as 'Laura Keene's Theater.' Here *Our American Cousin* was first produced. It was during the production of this play at Ford's Theater, Washington, that President Lincoln was assassinated, Mrs. Keene, one of the actors, being among the first to reach his side.

Keene, a city, capital of Cheshire County, New Hampshire, 50 miles W. S. W. of Concord. It has railroad repair shops and manufactures of pottery, furniture, woolen goods, boots and shoes, wooden wares, etc. Pop. 10,068.

Keep (kēp), in castles of the old type, a kind of strong tower, to which the besieged retreated and made their last efforts of defense.

Keeper of the Great Seal, in England, so called because the sovereign's great seal is delivered into his custody. See *Chancellor*. The Keeper of the Privy Seal is an official through whose hands pass all charters signed by the king, before they come to the great seal.

Keewat'in. See *Kewatin*.

Kehl (kāl), a town of Baden, at the confluence of the Kinzig and Schulter with the Rhine, opposite Strasburg, once an important fortress, but its fortifications have been dismantled. Pop. 4000.

Keighley (kē'lā), or KEITHLEY (kēth'lā), a municipal borough of England, West Riding of York; the headquarters of the worsted spinning trade. There are also several paper and corn mills machine and tool factories. Pop. 71,930.

Kei River (kā), GREAT, in Southeast Africa, formerly the boundary between British Kaffraria and Kaffraria Proper, rises with its branches, the Black and White Kei, in the Stormbergen Mountains, and flows southeast into the Indian Ocean.

Keiskama (kēs-ka'ma), a river in South Africa, formerly the boundary between Cape Colony and British Kaffraria.

Keith (kēth), a town of Scotland, partly in Banff, partly in Elginshire, on the Isla, 15 miles S. E. of Elgin. It has flour-mills, some spinning and weaving of wool, and other industries. Pop. 4753.

Keith (kēth), JAMES, a distinguished soldier, born in Scotland in 1696; died in the battle of Hochkirch in 1758. He was the son of William Keith, earl-marischal of the kingdom, and when 19 fought in the battle of Sheriffmuir for the Pretender. Outlawed and his property confiscated, he fled to France, saw military duty in Spain and Russia, and in 1747 transferred his services to Prussia, where he became field marshal and confidential adviser of Frederick the Great. In 1749 he was governor of Berlin. He was esteemed by Frederick, who made him his companion.

Kelat (ke-lät'), or KHELAT', a town of Beluchistan, capital of the territories of the Khan of Khelat, occupies the side of a hill at a height of nearly 7000 feet above the sea. It is surrounded by a mud wall flanked with bastions, and the streets are narrow and filthy. The manufactures consist chiefly

of muskets and sword cutlery; and there is a small trade with Sind, Bombay and Candahar. Kelat was stormed by the British in 1839, recaptured by insurgents from a weak garrison of Sepoys, and again taken by the British. Pop. estimated at 12,000.

Kellermann (kā-ler-moṇ), François Christophe, Duke of Valmy, marshal and peer of France, born in 1735; died in 1820. He joined the army as a volunteer in 1752, distinguished himself during the Seven Years' war, and rose rapidly to the command of an army corps. At the commencement of the revolutionary war he received the command of the army of the Moselle, formed a junction with Dumouriez, and sustained the 'cannonade of Valmy,' which caused the allies to retreat. In the following wars Kellermann received various commands, and Napoleon loaded him with honors. After the restoration of the Bourbons he was appointed a member of the chamber of peers. His son, the second duke, born in 1770; died in 1835, also distinguished himself in the Napoleonic wars, in Italy, in the Peninsula, in the campaign of 1813, at Ligny and at Waterloo.

Kellogg (kel'og), Clara Louise, born at Sumterville, South Carolina, in 1842, appeared in opera in New York in 1861, and afterwards sang with great applause in the principal cities of Europe and America. For years she conducted an English opera company of her own. In 1887 she married Carl Strakosch and retired.

Kells (kels; originally *Kenlis*), a town of Ireland, County Meath, picturesquely situated on a small hill near the Blackwater, 35 miles northwest of Dublin. It is a very ancient town, and was formerly a place of much ecclesiastical importance, with magnificent edifices. There is a round tower here. Pop. 2428.

Kelly, William D., legislator, born at Philadelphia, Pennsylvania, in 1814; died in 1890. He studied law and was attorney-general of Pennsylvania 1845-46, and judge of the court of common pleas, 1846-56. He joined the Republican party, was elected to Congress in 1860, and remained a member of the House till his death. He became noted as a vigorous advocate of protection and supporter of the iron interests, and in his later years was known as the 'Father of the House.'

Kelp, in commerce, the crude alkaline substance obtained by burning sea-weeds, chiefly of the species *Fucus serrātus, F. vesiculōsus, F. nodōsus, Laminaria bulbōsa, L. digitāta.* The sea-weed is gathered during the summer, dried on the shore, then stacked under shelter for some weeks until it becomes covered with a white, saline efflorescence, when it is ready for burning, which is effected in a round, brick-lined pit, or oblong kiln. As the weed softens, it is well stirred with a heated iron until it becomes a semifluid mass; it is then cooled and broken into pieces ready for the market. When salt was dear, the bulk of soda used in soapmaking was obtained from kelp and barilla, and the kelp manufacture was a source of large profit in Ireland, Scotland and the Hebrides; but since soda can be manufactured from salt much cheaper, it has ceased to be a flourishing industry. Kelp is now chiefly used for the production of iodine and chloride of potassium; a ton of kelp yields about 8 lbs. of iodine.

Kelso (kel'sō), a Scottish town in Roxburghshire, situated at the confluence of the Teviot and Tweed, on the left bank of the latter, 38 miles S. E. of Edinburgh. In the outskirts of the town are the magnificent ruins of Kelso Abbey, founded and endowed by David I in 1128. It is in the form of a Latin cross, and is a fine specimen of the Norman style of architecture. In the immediate vicinity is Floors Castle, the seat of the ducal family of Roxburgh. Pop. 4008.

Kelts. See *Celts.*

Kelung (kel-ung'), a town and seaport of Japan, in the northern part of the island of Formosa. Coal fields are worked by the Chinese in the neighborhood, and large quantities of coal are exported. There is also an extensive export trade in rice, sugar and camphor. Pop. about 5000.

Kelvin, Lord. See *Thompson, Sir William.*

Kemble (kim'bl), Charles, an English actor, born in 1775; died in 1854, a younger brother of John Phillip Kemble. He was educated at Douay (France), returned to England 1792, obtained a situation in the post-office, but relinquished it in favor of the stage in 1794, when he made his first appearance at Drury Lane. His success was largely due to his representations of such characters as *Edgar, Romeo, Charles Surface, Antony,* etc.; and to his fine voice, handsome face and figure. He was appointed censor of plays in 1840, when he retired from the stage, and only gave occasional Shakesperean readings. He had married the favorite actress Miss de Camp in 1806, by whom he was the father of John Mitchell Kemble, Frances Anne Kemble and Adelaide Kemble.

Kemble, FRANCES ANNE, popularly known as Fanny Kemble, writer and actress, eldest daughter of Charles Kemble, and niece of Mrs. Siddons, was born at London in 1811. Her father being in financial difficulties, she was induced to appear on the stage, which she did in 1829 at Covent Garden as *Juliet*, and her success was so great that in the course of three years she managed to relieve the fallen fortunes of the family. Her trip to America in company with her father was also a splendid triumph, and while there she contracted an unfortunate marriage (1834), which was annulled by divorce 15 years afterwards. She retired for many years to Lenox (Mass.), where she was busy with her pen. She returned to London in 1847, and from that time she resided alternately in America, England and the Continent, appearing at intervals as a public reader. Of her most successful writings are the tragedy *Francis I* (in which she herself acted the part of Louis of Savoy); *Journal of a Residence in the United States; Journal of a Residence on a Georgia Plantation; Records of a Girlhood; Records of Later Life;* and her *Notes* on some of Shakespere's plays. As an actress she excelled in the characters of *Portia, Beatrice, Lady Macbeth, Lady Teazle* and of *Julia* in the *Hunchback*. She died in 1893.—Her sister ADELAIDE, born in 1820, greatly distinguished herself on the operatic stage, but retired on her marriage in 1843.

Kemble, JOHN MITCHELL, an eminent Anglo-Saxon scholar, son of Charles Kemble, born in 1807; died in 1857. He was graduated at Cambridge, and, having taken up the study of Anglo-Saxon, spent a considerable time in studying the ancient MSS. in the libraries there. He edited *Beowulf* and other Anglo-Saxon works, including an incomplete edition of the *Anglo-Saxon Gospels*, and a collection of all the known charters of the Anglo-Saxon period, under the title of *Codex Diplomaticus Ævi Saxonici*. Perhaps his most valuable work is the *Saxons in England* (London, 1849, 2 vols.). For a number of years he edited the *British and Foreign Review*, and later he acted as censor of plays.

Kemble, JOHN PHILIP, one of the most eminent tragedians of the British stage, eldest son of Roger Kemble (manager of a provincial theatrical company), was born at Preston in 1757; died at Lausanne in 1823. Being intended for the church, he was sent to the Roman Catholic college of Douay (France), where he distinguished himself by his fine elocution; but, in spite of his parents' opposition, he selected the stage as a profession, made his first appearance at Drury Lane in 1783, and became at once popular. He was afterwards manager of this theater in 1788-1802. From 1801 to 1803 he made a most successful tour in France and Spain, and on his return to London purchased a share in the Covent Garden Theater, and made himself a splendid reputation in the characters of *Julius Cæsar, Hamlet, Macbeth, Coriolanus*, etc. His theater having been burned down, he opened the new edifice in 1809 with an increase of prices, which, together with certain other obnoxious arrangements, created for a series of nights the notable disturbances known by the name of the *O. P.* (*old price*) *riots*. He abandoned the stage in 1817, and received many tokens of esteem from his numerous admirers on that occasion. His statue was placed in Westminster Abbey in 1833. His acting was distinguished for dignity, precision and studious preparation, but was wanting in fire and pathos. His sister, SARAH, was the celebrated Mrs. Siddons.

Kempen (kem'pen), a manufacturing town in Rhenish Prussia, 20 miles N. W. of Düsseldorf, celebrated as the birth place of Thomas à Kempis (1380). Pop. 6319. There is another town of the same name in the Prussian province of Posen. Pop. 5787.

Kempis, THOMAS A. See *Thomas à Kempis*.

Kempten (kemp'ten), a fortified Bavarian town on the Iller, which is here navigable, 65 miles S. W. of Munich. It has large cotton mills, woolen and linen factories, and much-frequented fairs. Pop. 20,663.

Ken, THOMAS, an English prelate of great learning and moral worth, born in 1637; died in 1711. After studying at Oxford he became successively chaplain to the Princess of Orange, to the Earl of Dartmouth, and in 1684 to Charles II, who made him Bishop of Bath and Wells. In 1688 he was sent to the tower for resisting the dispensing power claimed by James II, and yet some months later he refused to take the oath of allegiance to William of Orange, and was dispossessed of his see; but Queen Anne granted him a pension. His sermons and moral treatises have long been forgotten, but his morning and evening hymns are still cherished in many a household.

Kendal (ken'dal), or KIRKBY-KENDAL, an English manufacturing town, County Westmoreland, agreeably situated on the Kent. The Flemings settled here in 1337 and the town became famous for its woolens and 'Kendal-

green' buckram. Among its manufactures are serges, carpets, tweeds, knitted goods, fish hooks, etc. Pop. (1911) 14,033.

Kenia (kā'nē-a), an isolated mountain mass in Eastern Africa, only a few miles south of the equator, about 18,000 feet high.

Kenilworth (ken-il'worth), a town of England, in Warwickshire, 4 miles north of Warwick. Kenilworth Castle, now a magnificent ivy-covered ruin, was founded in the reign of Henry I. The gorgeous entertainment given here in 1575 to Queen Elizabeth by the Earl of Leicester is familiar to all readers of Scott's *Kenilworth*. Pop. 5776.

Kennebec (ken-e-bek'), a river of Maine, rises in Moosehead Lake, and after a course of 150 miles, mostly E. S. E., empties itself into the Atlantic 12 miles below Bath. It is navigable for ships as far as Bath and for steamers to Hallowell, 40 miles.

Kennedy, JOHN PENDLETON, statesman and author, was born at Baltimore, Maryland, in 1795; died in 1870. He served in the war of 1812, was elected in 1820 to the Maryland legislature, and was subsequently three times elected to the United States House of Representatives, where he actively supported the Whig policies. In 1852 he was made Secretary of the Navy. He published several popular novels, the best known being *Swallow Barn* and *Horse-Shoe Robinson*, also a *Life of William Wirt* and other works.

Kensett, JOHN FREDERICK, landscape painter, born in Cheshire, Connecticut, in 1818; died in 1872. He studied in London and Rome, among his best works being *Sunset in the Adirondaeks*, *Franeonia Mountains* and *Hudson River from Fort Putnam*.

Kenneh (ken'e), or KENEH, a town of Upper Egypt, on the right bank of the Nile, well known for its pottery manufacture.

Kennicott (ken'i-kot), BENJAMIN, an English divine, professor of theology at Oxford, born in 1718; died at Oxford in 1783. He is best known by his edition of the Hebrew text of the Bible, the finest edition extant.

Kenora (kē-nō'ra), a town, province of Ontario, Canada. Pop. (1911) 6158.

Kenosha (kē-nō'sha), capital of Kenosha County, Wisconsin, on Lake Michigan, 34 miles S. of Milwaukee. It has a good harbor, a large shipping business and extensive fisheries. It has also large manufactures of brass goods, automobiles, leather, bedsprings and stockings, with various other industries. Pop. 21,371.

Kenrick (ken'rik), FRANCIS PATRICK, Catholic archbishop, was born in Dublin, Ireland, in 1797. In 1830 he was nominated coadjutor Bishop of Philadelphia. In 1851 he was translated to the see of Baltimore. He was a profound Hebrew scholar, and was considered the ablest theologian the Roman Catholic Church has produced in the United States. His theological works have been largely used. He died in 1863.—His brother, PETER RICHARD, born in 1806; died in 1896; became bishop of St. Louis in 1843 and archbishop in 1847.

Kensington (ken'sing-tun), a western and fashionable suburb of London. It contains the famous Kensington Palace, around which are the beautiful Kensington Gardens. Also the South Kensington Museum, Natural History Museum, etc. Pop. 176,623. —Also the name of a great carpet manufacturing section of Philadelphia, Pennsylvania, in the northeastern part of the city, of note as the site of Penn Treaty Park, the place where William Penn made a treaty with the Indians in 1682.

Kensington Museum, or SOUTH KENSINGTON MUSEUM, a museum in London, originated by Prince Albert in 1852. It is a red brick and terra-cotta structure in the Renaissance style, and was first opened in 1857. It contains probably the most beautiful and generally interesting collection in Europe, comprising objects of industrial art, both ancient and modern, products and materials used in manufactures, building, engineering, etc.; reproductions of ancient sculpture and architecture, modern paintings in oil and water-color, and sculpture by British artists, besides occasional loan collections. South Kensington Museum is under the direction of the Council of Education and receives large government grants. It forms the center of industrial art education in Great Britain, and a school of science and cookery is also connected with it.

Kent, a maritime county of England, forming the southeast extremity of the kingdom; area, 1170 square miles, nearly all arable, meadow, or pasture. Off the east coast lie the well-known Goodwin Sands, between which and the mainland is the roadstead called the Downs. The county is traversed from east to west by the North Downs, a range of chalk hills rising to 650 feet, and terminating in lofty chalk cliffs at Dover, Folkestone, and Hythe. The district south of this range, or between it and

KENTUCKY

Scale of Miles
0 10 20 30 40 50 60

89° A 88° B 87° C 86° D 85° E 84° F 83° G

Longitude West from Greenwich

Greencastle
Terre Haute
Rushville
Shelbyville
Middletown
Washington C.H.
Logan
Chillicothe
Wellston
Greensburg
Columbus
Bloomington
Bloomfield
Vernon
Petersburg
Burlington
Independence
Hamilton
Cincinnati
Covington
Newport
Waverly
Sardinia
Alexandria
California
Georgetown
Augusta
Dover
Maysville
Portsmouth
Gallipolis
Ironton
Ashland
Vincennes
Bedford
Scottsburg
Madison
Carrollton
Ghent
Glencoe
Warsaw
Verona
Walton
Butler
Falmouth
Brooksville
Germantown
Corinth
Concord
Vancehurg
Greenup
Russell
Quincy
Centralia
Mt. Vernon
Princeton
White R.
Huntingburg
Owenton
Sulphur
Gratz
Sadieville
Berry
Mt. Olivet
Nepton
Ewing
Flemingsburg
Mays Lick
Randville
Catlettsburg
Grayson
Olivehill
Coalton
Denton
Buchanan
Louisville
Jeffersonville
New Albany
Eminence
Anchorage
Newcastle
Monterey
Cynthiana
Carlisle
Millersburg
Hillsboro
Morehead
Fireclay
Willard
Webbville
Louisa
Duquoin
Benton
Carmi
Evansville
Highland Park
Mt. Washington
Shelbyville
Christiansburg
Switzer
Paris
Sharpsburg
Owingsville
Sandy Hook
Martha
Carmi
Henderson
Mt. Vernon
Eldorado
Shawneetown
Brandenburg
Irvington
Grahamton
Taylorsville
FRANKFORT
Midway
Versailles
Lexington
Middletown
Mt. Sterling
Salt Lick
Farmers
Scranton
Charley
Peach Orchard
Inez
Lawrenceburg
Tyrone
Keene
Winchester
Liberty
Whitehouse
Paintsville
Corydon
Rockport
Hebbardsville
Yelvington
Cloverport
Lebanon Jc.
Shepherdsville
Bloomfield
Fairfield
Cornishville
Nicholasville
Clay City
Stanton
Frenchburg
Owensboro
Vincegrove
Hardinsburg
Elizabethtown
Rineyville
Springfield
Harrodsburg
Perryville
Danville
Burgin
Kirksville
Lancaster
Ford
Richmond
Glencairn
Irvine
Hazelgreen
Salyersville
Campton
Prestonburg
Eastpoint
Zebulon
Phelps
Pikeville
Marion
Dekoven
Curdsville
Whitesville
Fordsville
Falls of Rough
Big Clifty
Cecilian
Glendale
Newhaven
Mitchellsburg
Lebanon
Junction
Rowland
Stanford
Kingston
Berea
Beattyville
Jackson
Clayhole
Caseyville
Sturgis
Sebree
Blackford
Clay
Dixon
Calhoun
Livermore
Beechgrove
Hodgenville
Bradfordsville
Hustonville
Crab Orchard
McKee
Booneville
Lackey
Hindman
Robinson Creek
Mouthcard
Providence
Lisman
Slaughtersville
Hanson
Hartford
Leitchfield
Caneyville
Buffalo
Spurlington
Bonnieville
Liberty
McKinney
Mt. Vernon
Conkling
Chavies
Hazard
Democrat
Vienna
Carrsville
Marion
Madisonville
Earlington
Mortons Gap
Dawson Spgs.
Fredonia
Dycusburg
Smithland
Paducah
Metropolis
Bandana
Grand Rivers
Kuttawa
Eddyville
Princeton
Hopkinsville
Elkton
Greenville
Penrod
Mudriver
Dunmor
Lewisburg
Auburn
Rochester
Browns ville
Glasgow Jc.
Glasgow
Edmonton
Jamestown
Russell Sprs.
Somerset
Columbia
Care Cy.
Horsecave
Greensburg
Campbellsville
Canmer
Munfordville
Mammoth Cave
Morgantown
Bee Lick
Hillside
Central Cy
S. Carrollton
Hartford
Beaverdam
Horsebranch
Caneyville
Livingston
Altamont
Elvira
Bernstadt
E. Bernstadt
Pittsburg
Lily
London
Manchester
Hyden
Whitesburg
Cairo
Wickliffe
Blandville
Bardwell
Cerulean
Gracey
Cadiz
Linton
Trenton
Pembroke
Herndon
Guthrie
Allensville
Russellville
Scottsville
Franklin
Adairville
Fountain Run
Flippin
Burkesville
Tompkinsville
Albany
Bowling Green
Summershade
Bruce
Oakland
Smiths Grove
Tateville
Monticello
Greenwood
Williamsburg
Jellico Creek
Coolidge
Corbin
Gray
Barbourville
Wood bine
Flatlick
Pineville
Middlesboro
Harlan
Layman
Avondale
Pine Mtn.
Cumberland Mts.
Cumberland R.
Clinch R.
Bristol
Jonesboro
Morristown
Knoxville
Columbus
Hickman
Benton
Mayfield
Hardin
Dexter
Wingo
Murray
Fulton
Hazel
Union Cy.
Clarksville
Springfield
Gallatin
Paris
Obion
Pond
NASHVILLE
Lebanon
Gainesboro
Cookeville
Warthurg
Tateville
Pincknot
Redash
Halsey
Ohio R.
Mississippi R.
Tennessee R.
Cumberland R.
Big Sandy R.
Kentucky R.
Green R.
Licking R.
Morgantown Fk.
Green R.
Rolling Fk.
Salt R.
Beech Fk.
Rough R.
Barren R.
Nolin R.
Pond R.
Red R.
Kentucky
Tennessee
Illinois
Indiana
Ohio
West Virginia

Sussex, is called the Weald, and was anciently an immense forest. Its southeastern portion comprises Romney Marsh. The chief river is the Medway, which enters the estuary of the Thames. The soil is generally fertile, and agriculture is in a most advanced state. Kent is the principal hop county, but large crops of wheat, barley, beans and peas are also raised, and the cultivation of fruit, flowers, and vegetables is carried on extensively, London offering a near and ready market for this kind of produce. Kent has justly been termed the 'Garden of England.' Its chief manufactures are paper, chemicals, and gunpowder, and there are also some calico-printing and bleaching works. The county town is Maidstone. Pop. (1911) 1,019,870.

Kent, JAMES, an eminent American jurist, born in 1763; died in 1847. He was educated at Yale College, studied law, and was admitted an attorney in 1785. After practicing at Poughkeepsie he settled in New York, and became professor of law at Columbia College (1794-98). He was successively appointed master in chancery, recorder, judge of the Supreme Court, chief justice (1804-14), and chancellor of New York (1814-23). He a second time accepted the law professorship at Columbia College in 1824-25. His *Commentaries on American Law* (1826-30) at once became a standard work, while his decisions were quoted in the courts as of the highest authority.

Kent, WILLIAM, an English landscape gardener and artist, born in 1685; died in 1748. He was apprenticed to a coach-painter, but repaired to London, tried his hand at portrait and historical painting, and with the assistance of some of his patrons was enabled to study for some years in Italy. On his return he carried out some architectural work which was much admired, but he is best known as the founder of modern landscape gardening.

Kenton (ken'tun), a city, capital of Hardin County, Ohio, 56 miles N. of Springfield. It has the largest iron fence factory in the United States; also hardware works, saw and planing mills, bee keepers' supplies factory, etc. Pop. 7185.

Kent's Hole, a cavern near Torquay, Devonshire, England, in which have been found many bones of extinct species of animals.

Kentucky (ken-tuk'i), a South-Central State of the American Union, in the Mississippi Valley, bounded N. by Ohio and Indiana, N. W. by Illinois, W. by Missouri, S. by Tennessee, and E. by Virginia and West Virginia; area, 40,598 square miles. The surface of the State is gently undulating, excepting the southeast, which is somewhat mountainous. Few States are better provided with water communication. The Ohio forms the boundary on the north, and receives from within the State numerous tributaries, of which the most important are the Cumberland, Kentucky and Tennessee; the Mississippi, after receiving the Ohio, forms the boundary on the west. The climate is salubrious, the soil fertile, the principal crops being wheat, Indian corn and tobacco; but oats, barley, hemp and fruit are extensively raised, and stock breeding is another important feature, the Kentucky cattle and horses especially being celebrated. Not less important is the breeding of mules, of which many thousands are yearly exported, and of swine and sheep. The wool product is large and of fine quality. The 'blue-grass' region furnishes admirable pasture. Coal and iron ores of various descriptions abound in many parts of the State, Kentucky having iron ores of great richness and extensive coal beds, though this mineral wealth has not been largely exploited. Limestone occupies a large area, and in this formation is the famous Mammoth Cave, one of the world's wonders. The chief manufacturing industries comprise tobacco and cigars, whiskey and malt liquors, cotton and woolen factories, ironworks and tanneries. The central position of the State, and the abundant water and railway communication, have secured it a rapid commercial development. Kentucky originally formed part of Virginia, but was separated from it in 1790, and admitted into the Union in 1792. The seat of government is Frankfort, a comparatively small place; the oldest town is Lexington; but the largest and by far the most important city is Louisville. Pop. of State 2,289,905.

Kentucky River, a river of the United States, rises in the Cumberland Mountains, traverses the State of Kentucky, and after a course of 260 miles flows into the Ohio at Carrollton. By a series of improvements the lower portion has been rendered continuously navigable for steamers.

Kenyon College (ken'yun), an educational institution founded at Gambier, Ohio, in 1824, by Philander Chase, a bishop of the Protestant Episcopal Church. It has an endowment of about $600,000.

Keokuk (kē'ō-kuk), a city and one of the capitals of Lee Coun-

ty, Iowa, at the foot of the lower rapids of the Mississippi, 2 miles above the confluence of the Des Moines. It is an important business center, with an active river trade, a large butter, egg and poultry business, extensive lumber yards and mills, shoe, starch and canning factories, etc. A national cemetery is located here, also a medical college and other institutions of learning. Pop. 14,008.

Kephallenia. See *Cephalonia.*

Kepler (kep'ler), JOHANN, a great German mathematician and astronomer, born in 1571, near Weil (Würtemberg); died at Ratisbon in 1630. He studied at the University of Tübingen, and in 1593 he was appointed a teacher of mathematics at Gratz (Styria). Here he devoted himself with much ardor to the study of astronomy; but in 1599 the religious persecutions commenced in Styria, and Kepler, being a Protestant, gladly accepted Tycho Brahe's invitation to Prague, to assist in the preparation of the new astronomical tables, called the Rodolphine Tables. Tycho died in 1601, and Kepler continued the work alone, being appointed imperial mathematician and astronomer. After twenty-five years' incessant labor the tables were published in 1627 at Ulm. Kepler had become the happy possessor of all Tycho's papers, and the mass of observations made by that astronomer during twenty years, with a precision till then unsurpassed, enabled Kepler to establish his three laws (see next article) which have proved so fruitful in the development of astronomical science. Kepler enjoyed the patronage of the Emperors Rodolph and Ferdinand, the Dukes of Würtemberg and Wallenstein, but his life was a continued struggle; he was exposed to much religious persecution, and his domestic relations were equally unfortunate. The latter part of his life was chiefly passed at Linz as professor of mathematics. He wrote much, but the work that has rendered him immortal is his *Astronomia Nova, seu Physica Cœlestis tradita Commentariis de Motibus Stellæ Martis* ('New Astronomy, or Celestial Physics delivered in Commentaries on the Motions of Mars'; Prague, 1609, folio).

Johann Kepler.

Kepler's Laws, in astronomy, three laws discovered by Kepler (see preceding article) on which were founded Newton's discoveries, as well as the whole modern theory of the planets:—1. Every planet describes an ellipse, the sun occupying its focus. 2. The radius vector (line joining the center of the sun with the center of the planet) of each planet sweeps over equal areas in equal times. 3. The squares of the periodic times (the periods of complete revolution round the sun) of two planets are proportional to the cubes of their mean distances from the sun. These laws enabled Newton to determine the law of the attraction of gravitation.

Keppel (kep'el), AUGUSTUS, a British admiral, born in 1725; died in 1786; was the second son of the Earl of Albemarle. He entered the sea service at an early age, and accompanied Admiral Anson round the world (1740-45). He was placed in command of the Channel fleet in 1778, and in July of that year engaged the French fleet off Ushant. Having become partly disabled, he signaled for his van and rear divisions, but Palliser, in command of the rear, ignored the signal until too late. Palliser accused him of incapacity and cowardice, but Keppel was honorably acquitted, and received the thanks of both Houses of Parliament. In 1782 he was raised to the peerage under the title of Viscount Keppel and Baron Eldon. He was First Lord of the Admiralty in the cabinets of the Marquis of Rockingham and the Duke of Portland in 1782 and 1783.

Keratin (ker'a-tin; Gr. *keras*, a horn), a substance obtained from claws, feathers, hair, horn, nails, wool, and other epidermal appendages.

Kerbela (ker'be-la), or MESHED-HASSEIN, a town of Asiatic Turkey, vilayet of Bagdad, about 60 miles S. S. W. from Bagdad and 20 miles W. of the Euphrates. It is a very ancient city and holy to Mohammedans, especially to the Shiites, who make pilgrimages there in thousands, creating a brisk trade. Some of these pilgrims carry the bones of relatives for burial there, and the fees exacted form an important revenue. Pop. est. at 65,000.

Kerguelen's Land, KERGUELEN ISLAND (kerg'len), an uninhabited mountainous island lying in the Indian Ocean about midway between the Cape of Good Hope and Australia, discovered by the French navigator Kerguelen in 1772. Its outline is very irregular, the island being much cut up by fjords and inlets; greatest length about 85 miles, greatest breadth 79; highest summit over 6000 feet. The scenery is picturesque and often magnificent; glaciers and snow fields occupy a considerable area. The climate is wet and stormy, the temperature never very high nor very low. The fauna and flora are somewhat limited. The former includes the fur seal, sea elephant and numerous penguins, petrels, the albatross, etc.; the latter is most abundant in mosses and lichens, but the most peculiar form is the Kerguelen cabbage (*Pringlea antiscorbutica*), a perennial cruciferous plant. Trees are wanting. The island is only occasionally visited by whalers and sealers. Cook visited it in 1777, Ross in 1840, the *Challenger* expedition in 1874, and in 1874-75 parties from Britain, Germany, and the United States were stationed here to observe the transit of Venus.

Kerkuk (ker-kök'), officially called SHAHR-ZUL, a town of Asiatic Turkey, vilayet of Bagdad, about 140 miles N. of Bagdad, and the residence of the pasha. There are a number of petroleum and naphtha springs in its neighborhood, and it has considerable trade. Pop. chiefly Kurds and Jews, about 15,000.

Kermadec Islands (ker-mad'ek), since 1840 a British dependency under the jurisdiction of a New Zealand magistrate, but formally annexed in August, 1887. They consist of four principal islands, surrounded by a number of small islets and rocks. The most northerly and the largest is Sunday Island, 674 miles northeast of Auckland, area 7200 acres. They are of volcanic origin, and earthquakes and other disturbances have taken place in recent years. The surface is mostly rugged, but tracts occur not too steep for cultivation, with a rich soil. The highest peak is 1723 feet above sea-level. Vegetation is luxurious, the flora being similar to that of Northern New Zealand; fish and birds are plentiful. There is no good harbor. The first settlers were two Englishmen married to Samoan girls, who landed on Sunday Island in 1837, but left in 1848. Others have been there for shorter periods, and a family from Samoa took possession in 1878.

Kermân (ker-mān'), KIRMÂN, or SIRGAN, a town in Persia, capital of a province of the same name. It has numerous mosques, baths, caravanserais, and a well-furnished bazaar. Its manufactures consist of silks, shawls, woolens, etc. Pop. estimated at 45,000 to 70,000. The province of Kerman, in the southeast of Persia, has an area of 50,000 square miles and a pop. estimated at 600,000. In the east and south the soil is very fertile, the date, the grape, and the silkworm being largely cultivated.

Kermanshah (ker-mān-shä'), or KIRMANSHAHÂN', a town in Persia, province of Ardilân. The manufactures consist chiefly of carpets or rugs; the trade, chiefly transit by the routes from Bagdad, Shuster and Ispahan, is very considerable. Pop. about 30,000.

Kermes (ker'mēz), the dried female insects of the species *Coccus ilicis*, found in many parts of Asia and South Europe on the leaves of a species of oak shrub (*Quercus coccifera*), and supplying a durable red and scarlet dye. They have been utilized for dyeing purposes in the East from very ancient times, and in Germany and Spain since the middle ages; but since the introduction of cochineal their use has been confined to the Eastern countries and Spain, where the collection of these insects still gives employment to a large number of people.

Kermes Mineral, amorphous antimony trisulphide, a brown-red powder used in the preparation of artists' colors.

Kerosene (ker'o-sēn), an illuminating oil obtained by refining crude petroleum. The bulk of kerosene is supplied by the United States and Russia. America controlled the kerosene market for many years, but Baku, on the Caspian, has now become a formidable rival, not only driving American kerosene out of the Russian market, but also supplanting it in some other countries. See *Petroleum*.

Kerowlee. See *Karauli*.

Kerry (ker'ri), a maritime county of Ireland, on the southwest coast, in the province of Munster; area, 1852 square miles, of which about one-tenth is under tillage. Great part of it is mountainous, Carran Tual, the highest peak in Ireland, attaining a height of 3414 feet above sea-level; other parts are very fertile, producing excellent pasture and good crops of oats, barley and potatoes, but agriculture is much neglected.

The climate is mild and moist. The coast is much indented by bays and inlets (Dingle Bay, Kenmare River, etc.); the interior presents much fine scenery, including the picturesque lakes of Killarney. Iron ore, copper and lead exist, and a superior kind of slate and flagstone is obtained in great quantities in the island of Valentia. The chief exports are oats and dairy produce. Principal towns, Tralee and Killarney. Pop. 165,726. It has fallen off greatly during the last half century.

Kersey (ker'zi), a strong coarse woolen cloth, generally ribbed, and formerly largely manufactured in Germany, France and the North of England, for making riding and hunting suits, but now chiefly used in liveries for the parts exposed to extra strain and wear.

Kerseymere (ker'zi-mēr), or CASSIMERE (from the town *Cashmere*), the name given to a light fabric woven from the finest wools; principally in the west of England, and at Elbeuf, France. It is chiefly used for ladies' jackets and gentlemen's gaiters.

Kertch, or KERCH (ancient *Panticapæum*), a fortified seaport town of Russia, in the Crimean peninsula, on the Strait of Yenikale, connecting the Sea of Azof with the Black Sea. The modern town is of quite recent existence; it is well built, advantageously situated for commerce, and has a rapidly growing trade. Pop. 29,000.

Kesho. See *Hanoi.*

Kestrel (kes'trel), or WINDHOVER (*Falco tinnunculus*), a species of the falcon tribe, widely distributed in Europe. It is remarkable for its habit of remaining suspended in the air by

Kestrel (*Falco tinnunculus*).

means of rapid wing motion, being at this time on the lookout for mice, which are its chief food. At times it will also eat small birds, and insects frequently. It varies from 12 to 15 inches in length; it nests in trees, also in old towers and buildings, and often utilizes an old crow's nest. In winter it migrates to North Africa and India.

Keswick (kes'ik), a town of England, in the county of Cumberland, 22 miles southwest of Carlisle, finely situated on the Greta, near Lake Derwentwater. Coarse woolens are manufactured, but the inhabitants depend chiefly upon trade with the visitors to the romantic scenery in the neighborhood. Pop. (1911) 4403.

Ketch (kech), a two-masted vessel of the galliot type, usually from 100 to 250 tons burden. Ketches were formerly often used as yachts, also as bomb-vessels.

Ketcho. See *Hanoi.*

Ketchup (kech'up), or CATSUP, said to be derived from the Japanese *kitjap*, a pungent sauce first introduced from the East, and employed as a seasoning for gravies, meat and fish. It was formerly prepared from mushrooms only, but numerous other products are now used for the same purpose. The best ketchup is obtained from mushrooms, walnuts and tomatoes; instructions for its preparation may be found in almost every cookery book.

Kettering (ket'er-ing), a market town of England, in the county of Northampton. Boot and shoe making is the staple trade, besides which tanning, currying, and the manufacture of agricultural implements are carried on. Kettering is the center of the ironstone district of the county, and daily sends thousands of tons of ore into Wales, Derbyshire and Yorkshire, besides having several smelting furnaces in the neighborhood. Pop. (1911) 29,976.

Kettle-drum. See *Drum.*

Kew (kū), a small village in the county of Surrey, England, situated on the right bank of the Thames, 1½ miles from Richmond. The royal botanic gardens and the connected pleasure-grounds (belonging to the nation), the former covering about 75 acres, the latter 250, are the chief attraction of visitors to Kew. They contain the finest collection of plants in the world, and are open to the public on Sundays as well as week days. Connected with the gardens is a museum and a herbarium, including some fine collections of preserved plants.

Kewanee (kē-wä'nē), a city of Henry County, Illinois, 132 miles s. w. of Chicago. Bituminous coal is mined here, and there are manufactures of steam heaters, boilers, windmills, pumps, etc. Pop. 9307.

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STEEL BRIDGE CONSTRUCTION

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CONCRETE VIADUCT

Views taken along the Key West extension of the Florida East Coast Railway, from Miami to Key West, a remarkable engineering feat. The distance is 155 miles and the roadway is carried over a series of small islands linked together with viaducts.

Kewatin (kē-wat′in), or KEEWATIN, a large Canadian territory under the jurisdiction of Manitoba, and stretching from Manitoba and Ontario to Hudson Bay, and northward to the Arctic Seas. The country is not much opened as yet; it is mostly densely wooded, and in many parts swampy, but rich in minerals, and game abounds. With a view to open up a new route via Hudson Bay a railway through the territory has been built. Area about 470,000 square miles. Pop. about 9000.

Kew-Kiang, or KIU-KIANG (kē-ö′-kē-āng′), a town and seaport of China, province Kiangsi, on the south bank of the Yang-tse-kiang. Its situation is not favorable for an extensive commercial port, but derives importance from its connection with the green-tea districts. The port was opened to foreign trade in 1862. Pop. over 60,000.

Key (kē), FRANCIS SCOTT, poet, was born in Maryland in 1779; died in 1843. He practiced law in Frederick, Maryland, and was district attorney of the District of Columbia for several terms. Detained against his will, he was on a British man-of-war when the attack was made on Fort McHenry, September 13, 1814. From this came the inspiration to the favorite American national song, *The Star Spangled Banner.*

Key, or KEYNOTE, in music, the principal or fundamental note or tone, to which the whole of a movement has a certain relation. See *Music.*

Keys, the name given to islets and sunken rocks, from Spanish *cayo* (an islet rock). It is especially applied to the group of small islands south of Florida.

Keystone, in architecture, the central stone of an arch or vault, which locks or keys the whole together, whence the name. See *Arch.*

Key West, a city, capital of Monroe County, Florida, on Thompson's Island, or Bone Key, a small, low-lying coral island south of Florida, 60 miles S. W. of Cape Sable, and commanding the entrance to the Florida Passage and the Gulf of Mexico. The city is a port of entry and military station of the United States and has a safe and accessible harbor defended by a fort. It has extensive docks, repair yards, marine railway, etc., and its mild climate has made it a popular health and winter resort. Cigars are very largely manufactured, shell work is made and there are important industries in sponges, coral and turtle shell, and in deep-sea fishing. A railroad over the keys and shallows to this island was opened in 1912. Pop. 19,945.

Kezanlik. See *Kazanlik.*

Khaibar (kī′bar). See *Khyber.*

Khairpur (khīr-pör′). See *Khyerpur.*

Khaki (ka′ki), the name given to the yellowish, earth-colored uniform now worn by United States soldiers, chosen for its inconspicuousness. Its name comes from a dye used to color the uniform of Indian soldiers and sepoys.

Khamgaon (khäm-gä′on), a town of India, in Akola district, Berar, with a trade in cotton, grain and opium. Pop. 18,341.

Khan (kan), a title given by Tartars, Persians and other Eastern nations to princes, chieftains, commanders and governors, but now generally reserved for governors of cities and provinces, these provinces being called *khanates.* Khan is also another term for caravansary, of which there are two kinds: one for pilgrims and travelers, with gratuitous entry; another, more commodious and with locked apartments, for traders, which is subject to a nominal charge.

Khandesh (khän-dāsh′), a district of British India, in Bombay Presidency, forming the most northerly portion of the Deccan tableland, and intersected by the Tapti River; area, 9944 square miles; pop. 1,460,000.

Khandwa (kund′wä), a flourishing town of India, Central Provinces, with a large trade. Pop. 19,401.

Khanpur (khän′pör), a commercial town of India, in the Punjab, on a navigable canal from the Panjnad. Pop. 7189.

Khargeh (*h*ar′jā), EL, a town in Upper Egypt, about 100 miles S. W. of Girgeh, the capital of the oasis of the same name, and an important station for caravans on the way to Darfur and Central Africa. It contains numerous ruins, and an acropolis of great interest. Pop. 5000 to 6000.

Kharkoff (*h*ar-kof′), or CHARKOV, a government of the south of Russia; area, 21,035 square miles; pop. 2,507,277. The country is open, the climate mild, the soil usually fertile, and agriculture is the chief pursuit of its inhabitants. The capital, Kharkoff, situated at the confluence of the Kharkoff and Lopan, has a considerable trade in cattle, grain, etc., and manufactures beet-sugar, soap, candles and leather. A bed of coal of immense extent in its vicinity is doing much to foster industries. The University of Kharkoff is an important educational center. Pop. 197,405.

Kharput (*h*ar′pụt), a town of Turkish Armenia, 60 miles N. of Diarbekir, on the route to Siwas, picturesquely situated on a rocky eminence in a plain watered by the Euphrates. It is noted for its castle and other ruins. Pop. 20,000 to 30,000.

Khartoum (*h*ar-töm′), a town in the Eastern Soudan, on the left bank of the Blue Nile, near its junction with the White Nile. It has sprung up since 1830, and is the capital of and largest town in the Egyptian Soudan, and the emporium of a large trade, ivory, gums, ostrich feathers, senna, etc., being exchanged for European goods, and slaves also formerly dealt in. It was the scene of Gordon's heroic defense against the insurgent Soudanese, and of his death in January, 1885. (See *Gordon.*) It was reduced to ruins by the Dervishes, who built the town of Omdurman on the other side of the Nile, but was retaken and restored in 1898. Pop. 69,349.

Khasi and Jaintia Hills, an administrative district of Assam; area, 6157 square miles. In these hills occurs the heaviest rainfall in the world. The Khasis are a peculiar race, speaking a monosyllabic agglutinative language that has no analogy elsewhere in India.

Khat. See *Catha.*

Khatmandu (khât-mân-dö′), capital of the Kingdom of Nepál, in Northern India, on the left bank of the Baghmati, on an elevated plateau, 150 miles north by west of Patna, with which it is connected by an important trade route. It is well built, and has many picturesque temples and pagodas. It is the seat of a British resident, and has considerable trade with Tibet. Pop. about 50,000.

Khedive (ke-dēv′), a word signifying *lord*, the title of the rulers of Egypt, originally granted by a firman from the sultan in 1866 to Ismail Pasha, then *Vali* or viceroy of Egypt.

Kherson (*h*er′son), or CHERSON, a maritime government of Southern Russia; area, 27,523 square miles; pop. 3,257,600. Almost the whole surface is one uninterrupted steppe, covered with long grass, and in many parts strongly impregnated with saltpeter. It is watered by the Dnieper, the Dniester and the Bug. Agriculture is in a defective state, but considerable attention is paid to the cultivation of vegetables and fruit. The bulk of the trade is carried on by its port of Odessa.—KHERSON, the capital, an extensive town on the right bank of the Dnieper, about 15 miles above its estuary, was formerly a very important town; but its trade is rapidly declining, being absorbed by Odessa, and Nicolaieff, with its growing dockyards, 40 miles distant. Tallow melting, ropemaking, and wool washing are still extensively carried on. Kherson is the resting place of Howard, the philanthropist, and has a monument in its vicinity erected to his memory by the late Emperor Alexander. Pop. 73,185.

Khiva (*h*ē′vå), or CHIVA, a semi-independent khanate of Central Asia, forming part of Turkestan. It formerly occupied a large extent of surface on both sides of the Amu-Darya or Oxus, but since the cession to Russia, in 1873, of its territory on the east of the Amu, it is now confined to the west side of this river. It is of a triangular shape, each of its three sides—of which the Amu forms one—being about 300 miles in length. One of its angles rests on the Sea of Aral. A great part of the surface consists of deserts, thinly inhabited or uninhabitable; but along the Amu the land is rich alluvial loam of the greatest natural fertility. Assisted by irrigation it yields luxuriant crops of grain, cotton, madder, fruit, including the vine and vegetables. The winter is neither severe nor prolonged, but the summer is very hot. Manufactures are lacking in importance. Trade is now being rapidly developed by Russian influence, especially by their Transcaspian Railway from the Caspian to Samarkand. The total population is about 800,000. The capital, KHIVA, lies on an alluvial flat at the junction of two canals, 50 miles west of the left bank of the Amu. It forms an irregular circuit of about 4 miles, and is enclosed by a dry ditch and an earthern wall about 20 feet in height and thickness, and entered by twelve gates, the masonry of which is of brick. Among the principal buildings are two palaces of the khan, a number of mosques, and the castles of the principal state officers. Pop. about 10,000.

Khoi (*h*o′i), a town of Persia, province of Azerbijan, 65 miles N. W. of Tabriz. Pop. about 35,000.

Khojend, or KHOJENT (kō-jent′), a town in Russian Turkestan, but formerly in the Khanate of Khokand, on the Bokhara frontier. It stands on elevated ground, and has been fortified by the Russians. It was formerly of much commercial importance, but trade has declined in recent years; a considerable trade in Russian goods is still carried on. Pop. 31,881.

Khokand, or KOKAND (kō-kand′), formerly an independent khanate of Central Asia, but since 1876

forming the province of FERGHÂNA in Russian Turkestan. Its present area is 29,650 square miles, generally mountainous. It is traversed from east to west by the Sir-Daria, which receives all its drainage. The summer is excessively hot, the winter cold, but dry. Cattle raising is the chief source of wealth, but heavy crops of grain and fruit are also produced. The manufactures consist chiefly of silk and cotton goods. The capital, KHOKAND, is situated on both sides of the Sir. It manufactures silk and cotton fabrics, and is the center of a large trade, ranking next in importance and size to Tashkent and Bokhara. Pop. 86,704.

Khorasan (*ho*-rä-sän′), a province of Persia, bordering on Afghanistan; area, 140,000 square miles; pop. 860,000. Much of the surface consists of deserts, but there are also fertile districts producing crops of cotton, hemp, aromatic and medicinal herbs. The most valuable mineral is the turquoise from the ancient mines of Nishapur. The principal manufactures are silk and woolen stuffs, carpets, muskets and sword-blades. About two-thirds of the inhabitants are Persians proper; the remainder are chiefly Turcomans and Kurds.

Khosru I. See *Chosroes I.*

Khotin (*hō*′tin), or CHOCZIM, a fortified town of Russia, province Bessarabia, on the Dniester, near the Austrian frontier. It figured much in the wars of the Poles, Austrians, Turks and Russians. Pop. 18,126.

Khurja (khör′*ja*), a town of India, N. W. Provinces, with a fine Jain temple and other good buildings, and a flourishing trade, especially in cotton. Pop. 29,277.

Khusháb (kösh-äb′), a town of India, in the Punjab, on the river Jhelum. Pop. 10,000.

Khuzistan (*hu*-zis-tän′), or ARABISTAN, a province of Persia, bounded on the south by the Persian Gulf, and on the west by Asiatic Turkey; area, 38,600 square miles, watered by the Karun and other streams; pop. estimated at half a million. In the south there are some extremely fertile plains, producing crops of rice, cotton, tobacco, indigo, silk and grain. The interior and north are mountainous, and flocks and herds maintain their inhabitants. Trade is chiefly carried on with Bagdad and Bussorah. Dizful and Shuster are the chief towns.

Khyber (khī′bėr), or KHAIBAR, a famous pass in the northeast corner of Afghanistan, the chief gate to that country from Peshawur, by means of which India has been invaded from time to time, and the scene of severe conflicts in the recent Afghan war. Its position renders it of the greatest importance to British India, and it is now fortified and under the jurisdiction of the lieut.-governor of the Punjab. It is 3373 feet above sea-level, about 50 miles long, and enclosed on each side by precipices from 600 to 1200 feet high.

Khyerpur, or KHYRPUR (khīr-pör′), a town of Sindh, 15 miles east of the Indus and 150 miles N. of Hyderabad. Pop. about 10,000.

Khyrabad (khī-rä-bäd′), a town of India, in Oudh, with numerous mosques and Hindu temples, and large fairs. Pop. 14,217.

Kiabooka Wood. Same as *Amboyna Wood.*

Kiachta (ki-a*h*′tȧ), a town of Siberia, in the province of Transbaikalia, on the river Kiachta, which forms the boundary between China and Russia. It formerly monopolized the overland trade between Russia and China, and the importation of tea still forms its chief commerce. Pop. about 20,000.

Kiang-si (kē-äng′sē′), one of the central provinces of China; area, 72,176 sq. miles; pop. 22,000,000. It is profusely watered by numerous streams, and the greatest portion of the soil is highly productive, especially in rice and sugar. The province manufactures paper, cotton and silk goods, and is celebrated for its porcelain. Its chief port is Kew-Kiang.

Kiang-su (kē-äng′sö′), the richest of the central provinces of China; area, 44,500 square miles; pop. about 21,000,000. Its products of nature and art excel those of almost any other province, while the inhabitants are of the most intelligent in the whole empire. The cities contain the finest specimens of Chinese architecture and decoration; the rice, wheat, cotton, silk and green tea produced are of the best, and the satins, cotton cloths, ink and paper manufactured are unsurpassed. The chief port in Nanking.

Kiaôtze (kē-ä-ot′zē), a branch of the ancient Chinese secret society of Thiendianhien, or Society of the Great Ancestor, which is over 2500 years old, and still flourishes in the north of the empire. It was the basis of the 'Boxer' outbreak of 1900, which led to the capture of Peking by foreign forces, sent to protect their embassies, and to later results of great importance.

Kibitka (ki-bit′ka), a tent of the nomad tribes of the Kirghiz Tatars. The frame consists of twelve stakes, each 5¼ feet high, set up in a

wheel-shaped roof-frame, consisting also of twelve stakes, united at one extremity but free at the other, so that the stakes radiate like spokes. The whole is covered with thick cloth made of sheep's wool, with the exception of an aperture in the center for the escape of smoke. The door is formed by the removal of a stake.

Kidd, BENJAMIN, an English sociologist, born in 1858. He won distinction by his first work on *Social Evolution* (1894), advancing the theory that society should be interpreted in terms of biology.

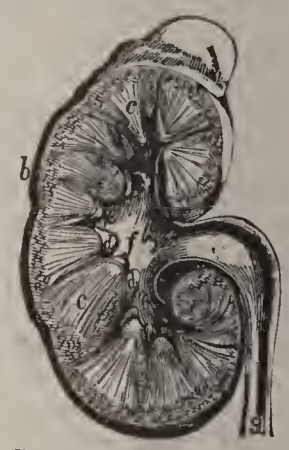
Kidd, WILLIAM, a celebrated pirate, known as Captain Kidd, born about the middle of the seventeenth century, and originally a shipmaster of New York. In 1696 he was appointed captain of the ship *Adventure Gallcy* of thirty guns by William III, for the suppression of piracy. In America he collected some 150 recruits, sailed for the East Indies; took to pirating in the Indian Ocean, and returned with his booty to New York in 1698. He was arrested and arraigned in England for piracy; but the charge could not be brought home to him; he was then tried for the murder of one of his crew, sentenced and hanged. The myth that he buried immense treasure on the shores of Long Island Sound, or the banks of the Hudson River, gave rise to one of Edgar Allan Poe's tales, and has induced many enthusiasts to seek for his treasures.

Kidderminster (kid'er-min-stėr), a parliamentary and municipal borough and market town of England, County Worcester, on the banks of the Stour. Kidderminster is famed for the manufacture of carpets, rugs, and tapestry, which form the staple industry of the place. Various other woolen fabrics are also made; and there are several extensive worsted spinning mills and dye-works, also iron-foundries, tin-plate works, flourmills, tanneries and breweries. Pop. (1911) 24,333.

Kidnapping (kid'nap-ing), the act of getting forcible and illegal possession of any person, an offense of varied degree, but always punishable by fine or imprisonment. In its more modern and limited sense, it is applied to the obtaining of slaves or native labor by force, as practised by the Arabs in Africa. This barbarous traffic existed in very recent years in the South Seas, carried on by Europeans, but now happily suppressed by the appointment of government labor agents. In Great Britain this term was formerly also applied to the illegitimate recruiting for the army and navy. There have been various notable instances of the kidnapping of children, for the purpose of enforced reward, in the United States.

Kidney Beans. See *French Beans.*

Kidneys (kid'niz), two of the abdominal viscera, in the form of two glands, the function of which is to secrete the urine from the blood. They are situated one on each side of the vertebral column at the back part of the abdominal cavity on a level with the last dorsal and two upper lumbar vertebræ. The right kidney lies at a slightly lower level than the left. They are of the well-known 'kidney-bean' shape. The concave side of each kidney is turned inwards and towards the spine. The depression on the inner side is termed the *hilum*, and from this notch the excretory duct or *urcter* proceeds, whilst the blood-vessels of the kidney enter and leave the gland at this point. The weight of each kidney of a male is about 5 oz., those of the female weigh each somewhat less. Each gland is covered by a thin sheath of fibrous tissue, which has no extension into the substance of the organ. The internal substance is divided into an outer deeper-colored *cortical* portion or *cortex*, and an inner lighter-colored or *medullary* portion. Both portions consist of tubes (*tubuli uriniferi*), which run a very tortuous course in the cortex, but continue as straight tubes in the medulla. The latter is formed into a series of conical fleshy masses, about twelve in number, called *pyramids of Malpighi.* These project into a cavity formed at the hilum by the expansion of the excretory duct, and called the *pelvis* of the kidney. Prolongations of the expanded ureter, called the *calyces*, invest the apices of the pyramids and dip in between them like funnel-shaped tubes. Now in the cortex the end of a tubule is dilated into a sac or capsule; into this a small branch of the renal artery enters, and then breaks up into a tuft of capillary blood-vessels. This tuft is called the *glomerulus*, and it and its capsules form a *Malpighian corpuscle*, about $\frac{1}{120}$th of an inch in diameter. So that a tubule,



SECTION OF HUMAN KIDNEY.

a, Suprarenal capsule, resting above the kidney. *b*, Cortex or corticalportion of kidney. *c c*, Medullary portion, consisting of cones. *d d*, Apices of the pyramids, projecting into their corresponding calyces *eee*. *f*, Pelvis. *g*, Ureter.

beginning at its dilated end, runs a tortuous course in the cortex, reaching the medulla becomes straight, and finally opens into the pelvis on the apex of a pyramid. The blood-vessels of the kidney consist of the *renal artery*, derived from the aorta, and the *renal vein*. The branches of the artery enter the gland at the hilum, and pass into the substance of the gland between the papillæ. Finally they reach the cortical portion, and therein subdivide into the minute vessels, which form the *glomeruli* of the Malpighian bodies. The renal veins leave the kidney also at the hilum, and pour their contents into the great main vein of the lower parts of the body (*vena cava inferior*). The nervous supply of the kidney is derived from the renal plexus, and from the solar plexus or large sympathetic mass of the abdomen. The separation from the blood of the constituents of the *urine* is accomplished in the glomeruli, and by the uriniferous tubules, the former straining off the watery parts of the blood, whilst the latter remove the more solid matters. Gradually, the secreted urine passes through the tubules, into the pelvis of the kidney, thence into the ureters, which in turn open into the bladder behind its orifice or neck. The urine is constantly entering the bladder drop by drop.

Inflammation of the kidneys is known as *nephritis*. Occasionally concretions of mineral substances accumulate in the kidney, and cause, in their passage from the gland and through the ureter, most excruciating pain. The most dangerous disease of the kidneys is that known as Bright's disease (which see).

Kidney Vetch, *Anthyllis*, a genus of plants, nat. order *Leguminosæ*. There are many species both shrubby and herbaceous. The variety found in Great Britain, chiefly on very dry soils, is the *Anthyllis vulneraria*, commonly called Lady's Fingers, with pinnate, unequal leaves, and heads of flowers generally yellow, sometimes graduating towards scarlet.

Kidonia. See *Aivali*.

Kief. See *Kiev*.

Kiekie (kē'kē), *Freycinetia Banksii*, a climbing shrub indigenous to the northern part of New Zealand, where it grows luxuriantly on lofty trees, and yields an edible, fleshy berry.

Kiel (kēl), a town of Prussia, in Schleswig-Holstein, beautifully situated on a deep bay of the Baltic, 54 miles north by east from Hamburg. The most notable buildings are the university and the royal palace (containing the university library). As a fortified naval port of Germany, with an imperial dockyard, and as the station of the greater part of the imperial fleet, Kiel is rapidly

rising in importance. Besides shipbuilding, it has iron-foundries, engineering works, oil-mills, tan yards, tobacco-works, etc. A ship canal connects it with the Elbe. Pop. (1910) 211,044.

Kielce (ki-el'tse), a government and town in Russian Poland; area of the former, 3897 sq. miles, pop. 910,900. It is watered by tributaries of the Vistula, and partly covered by offsets of the Carpathians. There are some iron and sugar factories, rapidly growing in importance, especially since the coalfields of the province have been opened.—The capital, KIELCE, is an ancient town about 50 miles northeast of Cracow. Pop. 23,189.

Kiepert (ke'pėrt), HEINRICH, a German geographer, born at Berlin, in 1818, where he studied history and geography under Ritter. In 1845 he became director of the Geographical Institute of Weimar, and in 1859 professor of geography at the University of Berlin. His services were secured for the Berlin Statistical Bureau in 1865. He has published numerous maps, much esteemed for their accuracy.

Kieserite (kē'zėr-īt), $Mg.SO_4H_2O$, a sulphate of magnesia obtained at Stassfurt and elsewhere, and

employed as a source of Epsom salt and in the manufacture of manures. Mixed with quicklime and water it hardens into a mass which, after heating, pulverizing, and again mixing with water, becomes of a marble-like consistency, and may be made into ornamental articles, etc.

Kiev (ki-ev′) or KIEFF (ki-ef′), a government of S. W. Russia; area, 19,691 sq. miles; pop. 4,206,100. The surface is in general flat, intersected occasionally by hills of moderate elevation along the course of the Dnieper and other streams. The Dnieper is the only stream navigable to any extent. The climate is mild, the summer very hot and dry. The manufacture of beet-sugar has made rapid strides in recent years, and the province is now the largest producer of that article in the empire.—KIEV, the capital, is picturesquely situated on the right bank of the Dnieper, which is here navigable, and crossed by a suspension bridge half a mile in length, one of the finest in Europe. It is an ancient place, and has been called 'the mother of Russian cities.' It was the capital of the kingdom in the ninth century. Kieff really consists of three towns, all more or less strongly fortified, and is the seat of the governor-general of the provinces Kieff, Podolsk and Volhynia. Its university is one of the most important of the empire. The connection by rail with Odessa and Kursk has done much to stimulate the trade of the town, which has grown very rapidly within recent years, its population of 50,000 in 1850 having increased to over 319,000.

Kilauea (kē-lö-ā′ä), an active volcano in Hawaii, one of the Sandwich Islands. It has an oval crater, 9 miles in circumference, with a lake of red and boiling lava at the bottom, over 1000 feet below the crater's mouth. It is the most remarkable and most incessantly active volcano in the world.

Kilda (kil′da), ST., a small and rocky island in the Atlantic Ocean, belonging to Scotland, 40 miles northwest from the northwest extremity of the island of N. Uist. Its inhabitants, less than a hundred in number, live largely on fish and sea-food. In the summer months the island is now frequently visited by tourists.

Kildare (kil-dār′), an inland county of Ireland, in the province of Leinster; length, 40 miles; breadth, 27 miles; area, 654 sq. miles. The surface is flat, or gently undulating, the soil mostly a rich loam. Oats, potatoes, barley and turnips are the principal crops. The manufacture of woolens is carried on to some extent, but the chief occupations are agricultural. Principal rivers —Barrow, Liffey and Boyne. Chief towns—Naas (the county town), Athy and Newbridge. Pop. 63,566.—The town of KILDARE stands on an eminence 30 miles S. W. from Dublin. Near it is the common known as the 'Curragh of Kildare,' 4858 acres, the property of the British government, on which a permanent military camp has been formed. Pop. 1576.

Kilderkin (kil′der-kin), a liquid measure of 18 gallons, a term now almost exclusively used by brewers to denote a half-barrel.

Kilia (kē′lē-ya), a seaport of Roumania on the Kilia arm of the Danube. It is fortified, and has a good trade. Pop. 11,703.

Kilimanjaro (kil-ē-män-jä′rā, the Great Mountain), a double-peaked, snow-clad mountain of Africa, in the territory of German East Africa, about 100 miles inland from the port of Mombasa, on the Suaheli coast. The highest peak, estimated at 18,881 feet, is the highest known in the African continent.

Kilkee (kil-kē′), a bathing place on the west coast of Ireland, County Clare. Pop. 1661.

Kilkenny (kil-ken′ni), a city of Ireland, in Kilkenny County, of which it is the capital, 73 miles S. W. from Dublin, delightfully situated on both sides of the Nore. The city contains several interesting ancient edifices, which give it a venerable and picturesque appearance. The manufacture of coarse woolens, brewing, and the working of Kilkenny black and foreign marbles into chimney-pieces, monuments, etc., form the chief industries of the town. Pop. 10,609. —The county, which is in the province of Leinster, has an area of 796 sq. miles. The surface is generally level. The principal rivers are the Barrow, Nore and Suir. The soil is for the most part light and dry, some valleys being extremely fertile, and dairying is carried on extensively. The chief crops are wheat, oats, barley, potatoes and turnips. Beds of fine black marble are quarried near the town of Kilkenny, and anthracite coal is raised chiefly for local consumption. Pop. 79,159.

Killarney (kil-lär′ni), a market town of Ireland, in the county of Kerry, in the midst of beautiful scenery, within a mile of the celebrated lakes to which it gives its name. These lakes are three in number, the largest being about 5 miles long. They are interspersed with wooded islands, and the lofty banks are also richly wooded. In summer Kil-

larney is thronged with visitors. Pop. 5656.

Killdeer (kil'dēr; *Charadrius vocifĕrus*), a variety of plover, common in America, and so called from its plaintive cry.

Killiecrankie (kil-li-kran'ki), a pass of Scotland, in the Grampians of northern Perthshire, above the river Garry, and on the Highland Railway. Here Claverhouse, Viscount Dundee, defeated the forces of William III.

Kilmainham (kil-mān'am), a western suburb of Dublin, Ireland, between the Liffey and the Grand Canal. It is chiefly known for its Royal Hospital and its county jail. The former is a retreat for invalided soldiers, and is supported by an annual government appropriation.

Kilmarnock (kil-mär'nok), a parliamentary and municipal burgh of Scotland, in the county of Ayr, 19 miles S. W. from Glasgow. It has long been famed for the excellence of its woolen manufactures, especially carpets, but machinery, hats, hosiery, leather, boots, etc., are also produced in increasing quantities. It is a rapidly improving town, and has many fine buildings, both public and private. Pop. 35,091.

Kiln (kil), a structure of brick or stone used for drying, baking, burning, annealing and calcining various substances and articles, such as corn, hops, malt, cement, limestone, iron ore, glass, bricks, pottery, etc. The construction of kilns naturally varies with the special object for which they are designed, but the same principle is involved in all, that is, the generation of ample and regular heat with the least expenditure of fuel.

Kilogramme (kil'u-gram), a French weight containing 1000 grammes = 2.2 lbs. Similarly *kilometer* = 1000 meters or 0.621 mile. See *Decimal System.*

Kilogrammeter (kil'u-gram-e-ter), a unit employed in the measurement of mechanical work; it is the mechanical work expended in raising a body whose weight is 1 kilogramme (2.2046 lbs.) through the vertical height of 1 meter (3.2809 feet), and is equal to 7.233 foot-pounds. See *Foot-pound.*

Kilrush (kil-rush'), a market town and seaport of Ireland, County Clare, on the north shore of the estuary of the Shannon. The manufacture of woolen and linen cloth is carried on to some extent. The town is much resorted to for sea-bathing. Pop. 4179.

Kilsyth (kil'sīth), a town and police burgh of Scotland, in Stirlingshire, 12 miles N. E. from Glasgow. The inhabitants are employed in iron and coal mining and cotton weaving. Pop. 7292.

Kilwinning (kil-win'ing), a town of Scotland, in Ayrshire, 21 miles S. W. of Glasgow. Pop. 4440.

Kimberley (kim'ber-li), the capital of Griqualand West, Cape Colony, and the center of the South African diamond fields, which produces 98 per cent. of the world's output. It is connected by rail with Port Elizabeth and Cape Town, and its commerce is rapidly increasing. It lies on an open plain, has broad streets, and is well equipped with all modern requirements of life. It sustained a long siege by the Boers, 1899-1900. Pop. 34,331.

Kimberley, a northern district of Western Australia, brought into notice by the discovery of gold-fields in 1886. It contains immense tracts of splendid pasture, and much land suitable for the cultivation of wheat, sugar, tobacco, etc. The chief port for the district is Derby, on the Fitzroy River.

Kimchi (kim'*hē*), David, one of the most famous Jewish rabbis of the middle ages, born towards the end of the twelfth century at Narbonne; died in 1240. He wrote commentaries on almost all the books of the Old Testament, and rendered essential service to Hebrew literature by the composition of his *Grammar and Dictionary of Hebrew Roots.* His father Joseph and his brother Moses also distinguished themselves as Hebrew scholars and theologians.

Kimmeridge Clay (kim'ėr-ij), a bluish slaty clay, containing some carbonate and sulphate of lime, found in thick deposits in the south of England (Kimmeridge in Dorsetshire) and the north of France. It is a member of the Upper Oolite.

Kin. See *Descent.*

Kincar'dineshire, or The Mearns, a maritime county on the east coast of Scotland; area, 383 sq. miles. The Grampian Mountains, by which it is traversed northeast to southwest, occupy a large portion of its surface, their highest summit within the county being Battock, 2555 feet above sea-level. The principal crops are oats, barley, wheat, turnips and potatoes. Stonehaven is the county town. Pop. 40,923.

Kindergarten (kin'der-gär-tn), a German word signifying 'children's garden,' and the name given to a system of infant education

introduced by Friedrich Froebel, who was largely assisted in its propagation by the Baroness Marenholz-Bülow. The system is intended to bring out the moral and intellectual capabilities of very young children chiefly by observation; pictures, toys, tools, etc., suitable for the purpose, being introduced, so as to convert schooling into play, which according to Froebel is the child's most serious business. The first kindergarten was opened in 1840 at Blankenburg (Prussia). The system has spread widely and is now very common in the United States.

Kinematics (kin-e-mat'ikz), a branch of mathematics which treats of the motions of bodies independently of the forces which produce them.

Kinematograph. See *Kinctoscope.*

Kinetics (kin-et'ikz), that branch of the science of dynamics which treats of forces causing motion in bodies. See *Dynamics.*

Kinetograph (kin-et'u-graf), an apparatus invented by Edison for taking pictures of moving objects. They are taken in rapid succession so as to include every phase of change. See *Vitascope.*

Kinetoscope (kin-et'o-skōp), an elaboration of a well-known toy by which a succession of snapshot portraits of objects in motion are enclosed in a cylinder with vertical slits and rapidly revolved. The retina of the eye retains each view a sufficient time to appear as one picture of objects in motion as viewed in the apparatus. The KINEMATOGRAPH is another device for the display of moving pictures, in which the pictures are thrown on a screen and are visible to an audience.

King (Anglo-Saxon, *cyning, eynig, eyng*), a person invested with supreme power over a state, nation,. or people, whether this power be acquired by inheritance, election, or otherwise. It is difficult to define what essentially constitutes a king, or to say in what he differs from an emperor, the power of kings and emperors alike varying largely in different nations.

King, CHARLES, soldier and author, born at Albany, New York, in 1844. He was graduated at West Point, and served in the army until 1879, when he was retired in consequence of a wound received in the Indian wars. In the war with Spain he served as a brigadier of volunteers in the Philippines. In 1901 he became commandant at Orchard Lake Military Academy. He is the author of a long series of popular novels dealing with army and frontier life.

King, WILLIAM RUFUS, vice-president, born in Sampson County, North Carolina, in 1786; died in 1853. He was elected to Congress in 1810, and was senator from Alabama, 1819-40. President Tyler appointed him minister to France in 1844, he was elected president of the Senate in 1850, and vice-president of the United States in 1852.

King-bird. See *Tyrannus.*

King-crab (*Limŭlus*), a peculiar genus of crabs included in the order Xiphosura (sword-tailed), of the class Crustacea. They are found on the coasts of northern and tropical America and the Antilles, in the Eastern Archipelago and Japan. The head resembles a broad horseshoe shaped shield, with two pairs of eyes upon the upper surface, the second pair being the larger and forming the true visual organs. The mouth opens on the lower surface, and around it are six pairs of limbs with spinous joints attached. A second shield somewhat hexagonal in shape covers the abdominal part, and beneath it are the gills, or *branchiæ*, borne upon five pairs of appendages which represent the abdominal feet of the crab. The average length is about 2 feet. These crabs are destitute of swimming powers, and if placed on their backs they appear, like turtle, unable to recover their natural position. The commonest species is the *Limŭlus polyphēmus*, found chiefly on the North American coasts. The upper surface of the tail, as in other species, bears numerous spines. The *Limŭlus Moluccānus*, of the Moluccas, possesses a strongly serrated tail. This latter species is largely eaten.

King-crab (*Limŭlus Polyphēmus*).

Kingfisher (king'fish-ėr), the name of a family of Insessorial birds distinguished by the elongated, stoutly formed, tetragonal bill, broad at the base, and terminating in a finely acute point; tarsi short, feet strong, toes somewhat elongated. The common kingfisher (*Alcedo ispida*) frequents the banks of rivers, and, perched on the bough of a tree, watches for fish. When the prey is perceived it dives into the water, secures the fish with its feet, and carries it to land, where it kills the prey, and swallows it entire. It is about 7 inches in length. This bird has been greatly celebrated in ancient poetic and legen-

dary lore, and is the subject of many superstitions. The American kingfisher (*Alcedo* or *Cerÿle alcyon*) is of a bluish-slate color, with an iron-colored band on the breast, while the head bears a crest

Spotted Kingfisher (*Cerÿle guttāta*).

of feathers. The spotted kingfisher (*Cerÿle guttāta*) is a native of the Himalayas, where it is called the fish-tiger. A large Australian species is known as the laughing jackass (which see).

Kinglake (king'lāk), ALEXANDER WILLIAM, an English historian, born in 1811, and educated at Eton and Cambridge. He was called to the bar in 1837, but abandoned law in 1856. He first made his mark in 1844 by the publication of *Eōthen*, a narrative of eastern travel. In 1857 he entered the House of Commons as member for Bridgewater, and took an active part in opposing several important bills of that period. The first volume of his *Invasion of the Crimea* appeared in 1863, and at once established his reputation as a brilliant historian; seven volumes followed at intervals, the eighth and completing volume in 1887, and they form together a magnificent record of this war. Died in 1891.

King of (or at) Arms, in England, an officer whose business is to direct the heralds, preside at their chapters, and have the jurisdiction of arms. There are three kings of arms in England—Garter, Clarencieux, Norroy, and an officer styled Bath King of Arms, attached to the order of the Bath. There are also Lion King at Arms for Scotland and Ulster King of Arms for Ireland.

King of the Herrings, the popular name of the *Chimæra monstrōsa*, or Arctic chimæra, a fish also known in certain localities by the name of 'Sea-cat.' See *Chimæra*.

Kings, BOOKS OF, form two books in the English and one book in the Hebrew canon of the Old Testament. Besides their own unity the books of Kings are closely connected with first and second of Samuel, and, following these, form the third and fourth in what is known as the four books of the kingdom. From internal evidence it would seem that these were written by a series of contemporary authorities, with additions and glosses made by a later writer. The history, as related in the books of Kings, begins with the close of David's reign, and carries the events onward to the capture of Jerusalem and the destruction of the temple. This embraces, according to the received chronology, a period of upwards of 400 years (B.C. 1015-588), and includes the history of both the kingdoms of Judah and Israel. This chronology, however, is unsatisfactory, and has been much disputed. In comparing these books with the Chronicles it is found that while the former describes the divided kingdom of Israel and Judah, the latter is occupied almost exclusively with Judah; and further, that the books of Kings seem to have been compiled under prophetic and the Chronicles under priestly influence.

King's Advocate. See *Advocate*.

King's-clover, an English name of the *Melilōtus officinālis;* called also the *Common* or *Yellow Melilot*.

King's College, original name of Columbia University (which see).

King's College, Canada, an institution maintained by the Anglican Church, situated at Windsor, Nova Scotia. It confers degrees in arts, science, engineering, law and theology. The Engineering School is situated in Sydney and Glace Bay, and the Law School in St. John, N. B.

King's College, London, a proprietary institution incorporated in 1829, and reincorporated in 1882. It was established for the purpose of providing education in accordance with the principles of the Church of England, and gives instruction in theology, general literature, science, engineering and medicine

King's County, an inland county of Ireland, province of Leinster; area, 772 sq. miles. A large portion of the N. and N. E. part is covered with the Bog of Allen, and of the S. with the Slieve Bloom Mountains. Limestone occurs in the N. W., and has been quarried. The principal produce is oats, wheat and potatoes, with no manufactures. The county town is Tullamore. Pop. 60,187.

King's Evidence. See *Approver*.

King's-evil. See *Scrofula.*

Kingsley, CHARLES, an English clergyman, novelist and poet, born in 1819; died in 1875. He was educated at King's College, London, and afterwards at Magdalen College, Cambridge, where he took his degree in 1842. He was subsequently appointed curate of Eversley, in Hampshire, and published a volume of twenty-five *Village Sermons*, which became popular. In 1848 he published a poem, *The Saints' Tragedy.* This was followed in 1849 by the novel *Alton Locke*, in which his opinions of the social and economic questions of the time are powerfully expressed. Upon the same lines, but dealing with the subject from the agricultural side, followed his novel of *Yeast* in 1851. In 1853 was published *Hypatia*, and in 1855 *Westward Ho*, both brilliant historical novels, the former dealing with the early Christian church, the latter with the South American adventurers of the Elizabethan era. Among his other well-known works are *Two Years Ago; Hereward, the Last of the English; Glaucus* and *The Water Babies.* He was appointed professor of modern history at Cambridge in 1859, and canon of Chester in 1869. His *Letters and Memories of his Life*, edited by his wife, was published in 1877.

Kingsley (kingz'li), HENRY, novelist and brother of Charles Kingsley, was born in 1830, and died in 1876. Educated at King's College, London, and Worcester College, Oxford, he left England to become an Australian colonist in 1858. On his return he contributed largely to magazines and reviews. Of the novels which he published between 1859 and 1874 *Geoffrey Hamlyn* was the first, while *Ravenshoe* and *Austin Elliott* are considered the best. He was also for a short time editor of the *Edinburgh Daily Review.*

King's Lynn. See *Lynn.*

Kingston (kingz'tun), a city of Ontario, Canada, on Navy Bay, the northeast corner of Lake Ontario, 199 miles S. W. Montreal, regularly and substantially built. There are here the Queen's University and College, a collegiate institution belonging to the Presbyterians, a mechanics' institute, a hospital, etc. The trade is very considerable, and the harbor is accessible to ships of large size. There are mineral springs in the town and neighborhood. Kingston was founded in 1783, on the ground formerly occupied by Fort Frontenac. It was incorporated in 1838. Pop. 18,874.

Kingston, a borough in Luzerne County, Pennsylvania, on the north branch of the Susquehanna, one mile from Wilkes-Barre. It is in a coal-mining region, and has manufactures of hosiery, machinery, etc. Pop. 6449.

Kingston, a city, the capital of Ulster Co., New York, on the Hudson, 53 miles S. of Albany. It is connected with New York city by rail and river and does a large trade, building stone, flagstones and coal being shipped. It has numerous manufactures, including carriage factories, iron foundries and machine shops, cement manufactory, etc. It was made a city in 1872. There are several collegiate institutions, and a Senate house in which, in 1676, the New York legislature held its first sessions. Pop. 25,908.

Kingston, the capital of the island of Jamaica, on the south coast, with straight and regular streets and houses, generally of brick. The principal public buildings are the English and Scotch churches, hospitals, courthouse, theater, penitentiary, barracks and jail. The harbor, which is 6 miles long by 2 miles wide, is separated from the sea by a narrow slip of low land, on which is situated Port Royal, and which forms an excellent anchorage for vessels of any size. It was ruined by an earthquake in 1907. Pop. 46,542.

Kingston-on-Hull. See *Hull.*

Kingston-upon-Thames, a town of England, county of Surrey, on the right bank of the Thames, 12 miles from Hyde Park Corner. Its antiquity is proved by numerous Roman remains found in its vicinity, and the Saxon kings were crowned here from Edward the Elder to Ethelred II. The stone on which the kings were crowned is preserved within an iron enclosure near the marketplace. In the neighborhood are Bushy and Richmond parks, and Hampton Court Palace. It is a suburban residence place and summer resort for Londoners. Pop. 37,977.

Kingstown (kingz'town), a seaport of Ireland, on the south shore of Dublin Bay, 6 miles S. E. of Dublin. Its most interesting object is its magnificent harbor, commenced in 1816 and finished in 1859 at a cost of $4,125,000. There are two piers, enclosing an area of 250 acres, with a depth varying from 15 to 27 feet. Kingstown has regular steam communication with Holyhead, in North Wales, and is visited annually by 1600 to 1800 vessels. It is much frequented for sea-bathing. Pop. 17,377.

King's-yellow, a pigment, the basis of which is orpiment or tersulphide of arsenic.

King-vulture, the *Sarcorhampus Papa* of the intertropical regions of America. It is about 2½ feet in length, and upwards of 5 feet across the expanded wings. The other vultures are said to stand quietly by until this, their monarch, has finished his repast.

Kingwood, a Brazilian wood believed to be derived from a leguminous tree, a species of *Triptolemœa*, but by some referred to *Brya ebĕnus*. It is beautifully streaked with violet tints or West Indian ebony, and is used in turning and small cabinet-work. Called also *Violet-wood.*

Kinkajou (kink'a-jou; *Cercoleptes caudivolvŭlus*), a plantigrade, carnivorous mammal of northern South America, allied to the bear family. In habits it is omnivorous, nocturnal and docile when captured. In shape it resembles the lemur, the legs are short, fur close and woolly, tail long and prehensile. Being fond of honey, they make frequent forays upon the nests of bees.

Kino (kē'nō, kī'nō), an astringent extract, resembling catechu, obtained from various trees. The original is procured from *Pterocarpus Marsupium*, a handsome East Indian tree, nat. order Leguminosæ, which yields a valuable timber. Kino is the juice of the tree dried without artificial heat. African or Gambia kino is obtained from another species (*P. erinaceus*), a native of tropical Western Africa. Dhak-tree or Bengal kino is the product of *Butea frondōsa;* while Botany Bay kino is got from various species of Eucalyptus. Kino consists of tannin, gum and extractive, and is a powerful astringent.

Kinkajou (*Cercoleptes caudivolvŭlls*).

Kinross (kin-ros'), a small inland county of Scotland, west of Fife, and entirely surrounded by that county and Perthshire; area, 81 sq. miles. Pop. 6981.—There is a small town of the same name in the county. Pop. 2136.

Kinsale (kin-sāl'), a seaport town of Ireland, in the county and 14 miles south of Cork, near the mouth of the Bandon, which here forms a magnificent harbor. The exports consist chiefly of farm produce, and its fishery is good. Pop. 4605.

Kinston, a town, capital of Lenoir County, North Carolina, on the Neuse River, 33 miles W. N. W. of Newbern. It is an important shipping point for cotton and tobacco, and has hosiery, yarn, silk and lumber mills, etc. Pop. 6995.

Kintyre. See *Cantyre.*

Kiosk (ki-osk'), a Turkish word signifying a kind of open pavilion or summer house, generally constructed of wood, straw or other light materials, and supported by pillars. It has been introduced from Turkey and Persia into the gardens, parks, etc., of Western Europe.

Kioto (kī-ō'to), or SAIKIO, a large city of Japan, in the island of Hondo, in an extensive plain 250 miles southwest of Yeddo, connected by railway with its port, Osaka, and some 6 miles from Lake Biwa. It was formerly the special residence of the mikado, and the

seat of his *dairi* or court, and hence the ecclesiastical capital of the empire. It is about 4 miles long and 3 miles broad, and abounds in exquisitely laid-out gardens, palaces and temples. It is the seat of a university, founded in 1897, and the center of learning, and of artistic manufactures, such as carved ivory ornaments, lacquered ware, bronze ornaments, brocaded and embroidered silks, etc. Pop. 379,404.

Kipling (kip'ling), RUDYARD, an Anglo-Indian novelist and poet, was born in Bombay in 1865. He was educated in England, returning to India in 1880. He produced with rapidity volumes of poems and stories relating to the life of the British in India, and attracting wide attention by their novel and picturesque character; in fact, he created a new epoch in this line: *Departmental Ditties*, *Plain Tales from the Hills* and *Soldiers Three* are collections of his tales. He subsequently resided in England and the United States, publishing a number of highly popular novels and poems, including his notable poem *Recessional*. His style is novel, graphic and highly original.

Kiptchaks (kip-chakz'), or KAPTCHAKS, the name given to a Tartar or Mongolian race. They were known as the Golden Horde, and founded a khanate about the thirteenth century, and their territory comprised the region watered by the Dnieper, Don, Volga and Ural.

Kiratpur (kē-r*a*t-pör'), a town of India, Bijnor district, N. W. Provinces. Pop. 12,728.

Kirby (kir'bi), WILLIAM, a distinguished English entomologist, born in Suffolk in 1759; died in 1850. He was educated at Ipswich, and at Caius College, Cambridge, and was appointed rector of Barham in 1796. Here his early love of natural history was developed, and on the establishment of the Linnæan Society in 1788 he was one of its first members. In 1802 appeared his work on English bees, entitled *Monographia Apum Angliæ*, which established for him a European reputation. A few years afterwards he formed a literary copartnery with Mr. Spence, and the result was the publication, in 1815, of the first volume of *Kirby and Spence's Introduction to Entomology*, of which the second volume appeared in 1817, and the third and fourth in 1826. It gives in the form of letters a familiar description of insects in all their phases as regards species, food, habits and qualities, beneficial or destructive. In 1830 Mr. Kirby was appointed to write one of the *Bridgewater Treatises* (which see), and he accordingly produced his *Habits and Instincts of Animals with reference to Natural Theology*. He wrote a description of the Arctic insects for *Captain Parry's Voyage*, and also for Sir John Richardson's *Fauna Boreali-Americana*.

Kircher (kir*h*'ẽr), ATHANASIUS, a learned German Jesuit, born in 1602; died in 1680. He was professor of mathematics, philosophy and the oriental languages at Würzburg, but the pope called him to Rome, where he at first taught mathematics in the Collegium Romanum.

Kirchhoff (kir*h*'hof), GUSTAV ROBERT, a German physicist, born in 1824. He was appointed professor of physics in the University of Heidelberg in 1854. He gave his attention to the subjects of heat, electricity and magnetism. Conjointly with Bunsen he discovered the spectroscope. He died in 1887.

Kirghiz, KIRGHIS (kir'gēz), a nomadic Mongol-Tartar race, numbering in its various branches about 3,000,000, and inhabiting the steppes that extend from the lower Volga and the Caspian Sea in the west to the Altai and Thian-Shan Mountains in the east, and from the Sea of Aral and the Sir-Daria in the south to Tobol and Irtish on the north. The Kirghiz are a slow, sullen people, small in stature, bad walkers, but born riders. Their food is chiefly mutton and horseflesh, and their drink the nourishing fermented mare's milk called *koumiss*. They dwell in a *yurt* or semicircular tent, the wooden framework of which is covered with cloth or felt. Agriculture is almost unknown; their possessions are in sheep, horses and camels, and their manufactures consist of cloth, felt, carpets, leather, etc. They profess Mohammedanism. Most of the varied Kirghiz tribes are, at least nominally, under Russian government.

Kirin (kir'in), a division or province and town of the Chinese territory of Manchuria, on the navigable Sungari River. Boats and junks are built here and it has a mint. The town, also called Kirinoola or Girin, has a pop. of 120,000. See *Manchuria*.

Kirkcaldy (kir-ka'di), known as the 'Lang Toun,' a seaport of Scotland, county of Fife, on the north shore of the Firth of Forth. It consists principally of one long, irregular street, which, including suburbs, extends for about 3 miles west to east. It has numerous flax-spinning mills, linen and damask factories, sailcloth and net factories, roperies, machine factories, etc., and

the largest linoleum and floor-cloth works in the world. The harbor is obstructed by a sandbank at its mouth, and is dry at ebb tide. The foreign trade is with the Baltic and the north of Russia. Adam Smith, author of the *Wealth of Nations*, was born here. Pop. 34,079.

Kirk, ELLEN WARNER, author, born in Southington, Connecticut, in 1842, married John Foster Kirk in 1879. Her books include *Love in Idleness*, *Through Winding Ways*, *A Lesson in Love*, etc.

Kirk, JOHN FOSTER, historian, born at Fredericton, New Brunswick, in 1824. He was secretary to the historian Prescott 1847-59, and wrote *History of Charles the Bold*. He edited a supplement to *Allibone's Dictionary of Authors*, edited *Lippincott's Magazine* 1871-86, and was lecturer in history at the University of Pennsylvania. He died in 1904.

Kirkcudbright (kir-kö'bri), a maritime county in the south of Scotland; area, 898 square miles. There are extensive mountainous districts; the rivers include the Dee and the Urr; and there are numerous lakes, the largest of which is Loch Ken. Granite is quarried in several districts, while lead, copper and iron have been found. The soil and climate are most suitable for green crops, and great attention is given to the rearing of cattle for the English markets. Pop. 39,383. The county town of the same name is a port on the Dee, 25 miles southwest of Dumfries. Pop. 2386.

Kirkintilloch (kirk-in-til'lo*h*), a burgh of Scotland, county of Dumbarton, on the Forth and Clyde canal, 6 miles by rail north by east of Glasgow. It has iron foundries, cotton factories, chemical works and coal mines. Pop. 10,680.

Kirksville (kirks'vil), a city, capital of Adair County, Missouri, 70 miles N. W. of Quincy, Illinois. It has a State normal school, and a school of osteopathy, and contains iron-works, canning, pickle and washing-machine factories, etc. Pop. 6347.

Kirkwall (kirk'wal), a seaport of Scotland, capital of the county of Orkney, on a bay on the east side of the island of Pomona or Mainland. Here are the old cathedral of St. Magnus (founded in 1137), the old castle of the earls of Orkney, and the ruins of the bishop's palace, in which King Hako died. The harbor is secure and commodious. Pop. 3711.

Kirman. See *Kerman*.

Kirmanshah. See *Kermanshah*.

Kirschwasser (kirsh'vàs-ėr), a liqueur distilled in Germany and Switzerland from the fermented juice of the small black cherry.

Kisfaludy (kish'fa'lö-di), ALEXANDER, a Hungarian poet, was born in 1772; died in 1844. In 1793 he entered the Austrian army as a cadet, and made campaigns in Germany and Italy. During a residence in Vienna, as a member of the royal Hungarian bodyguard, he devoted himself to the translating of Tasso into Hungarian. In 1801 he left the army, and employed himself almost exclusively in agriculture and in literary pursuits. His principal lyrical work, *Himfy Szerelmei* ('Himfy's Love Songs'), gave him a first place among his native poets. He afterwards wrote the historical dramas *John Hunniades* and *Ladislaus the Cumanian*. His brother Charles, who almost equaled him in literature, died in 1830.

Kishinev (kē-shē-nyof'), or KISHENAU, a town of Russia, capital of the government of Bessarabia, on the Byk, a tributary of the Dniester. In 1812 only a small miserable town, it is now the seat of the civil and ecclesiastical authority, has many churches, schools, theaters and large markets for cattle and corn. Pop. 125,787.

Kismayu (kis-ma'yä), a seaport on the coast of East Africa, south of the mouth of the Juba, the administration of which was conceded by the Sultan of Zanzibar to the Imperial British East Africa Company in 1889. Pop. 8000.

Kisoriganj (kēs-ō-rē-gunz'), a town of Hindustan, in Bengal, 13 miles east of the Brahmaputra. Pop. about 13,000.

Kiss, the mutual touching of the lips. With some nations, as the Germans and French, men often kiss each other after a long absence, etc. Kissing the hand of the sovereign forms part of the ceremonial of all European courts. Kissing the foot is a common oriental sign of respect, and the popes have required it as a sign of respect from the secular power since the eighth century. When this ceremony takes place the pope wears a slipper with a cross, which is kissed.

Kissingen (kis'ing-en), a watering place of Bavaria, on the Saale, 30 miles north of Würzburg. The springs, five in number, and all saline, contain a large quantity of carbonic acid gas, and are used both internally and as baths. Besides 20,000 visitors annually

attracted by the baths, about 500,000 bottles of water are annually exported. A complete course of water drinking and bathing occupies twenty-eight days. Pop. 4757.

Kistna (kist'na), or KRISHNA, a river of India, which rises among the Western Ghâts, about 40 miles from the Malabar coast, and flows in a general easterly direction, partly along the frontier of Hyderabad and the Madras Presidency, and falls into the Bay of Bengal 200 miles north of Madras; length, including windings, 800 miles. It is almost useless for inland navigation.

Kit-Cat Club, an English club formed about 1688, of a political character.

Kitchener (kich'en-er), HORATIO HERBERT, Baron, an English soldier, born in 1850. He entered the army in 1871, was in civil life 1874-82, took part in the Nile expedition of 1884, and commanded a brigade in the Suakim campaign of 1888. He was governor of Suakim 1886-88, adjutant-general of the Egyptian army 1888-92, and sirdar of this army, 1890-98. Promoted major-general in 1896, he commanded the Khartoum expedition of 1898 in which he completely defeated the Arabs and recovered the Soudan for Egypt. This brought him the title of Baron Kitchener of Khartoum. He took part in the Boer war and aided efficiently in the British success; was afterwards promoted lieutenant-general and field marshal.

Kitchen-middens (kich'en-mid-nz), the name given to certain mounds, from 3 to 10 feet in height and 100 to 1000 feet in length, found in Denmark, the north of Scotland, etc., consisting chiefly of the shells of oysters, cockles and other edible shellfish. They are the refuse heaps of a prehistoric people unacquainted with the use of metals, all the implements found in them being of stone, bone, horn, or wood. Fragments of rude pottery occur. The bones are all those of wild animals, with the exception of those of the dog. Similar shell deposits occur on the eastern shores of the United States, formed by the Indians.

Kite (kīt), a raptorial bird of the falcon family, differing from the true falcons in having a somewhat long forked tail, long wings, short legs and weak bill and talons. This last peculiarity renders it the least formidable of the birds of prey. The common kite, glead, or glede (*Milvus ictīnus, regālis, vulgāris*), preys chiefly on the smaller quadrupeds, birds, young chickens, etc. It usually builds in the fork of a tree in a thick wood. The common kite of America is the *Ictinia Mississippiensis.*

Kite, Man-lifting. The familiar kite has for many centuries been used as a toy, its first scientific use being when Dr. Franklin employed it to bring down electricity from the clouds. Of late years, in its new form of the box or cellular kite, it has come into use in observations of the atmosphere, the conditions of which at great heights have thus been discovered. Among the well-known types are the aërocurve kite invented by C. H. Lamson. It is of cellular construction, the forward supporting surfaces are curved like the wings of a bird, while the rear cell is flat and smaller in size, forming a tail-like rudder. (See Fig. 1.) The Malay kite (Fig. 2) is a form used in the Malay Peninsula. The frame consists of two sticks crossing each other at right angles, one of which is made so elastic that it bends in the wind and forms a bow. This bow balances the kite so that it flies without a tail. In the tetrahedral kite (Fig. 3), the frame is in the form of a tetrahedron, or is built up of individual parts, the frame of each forming a tetrahedron. Dr. Alexander Graham Bell's great tetrahedral kite in 1907 lifted Lieut. Selfridge 168 feet into the air, and sustained him for 7 minutes.

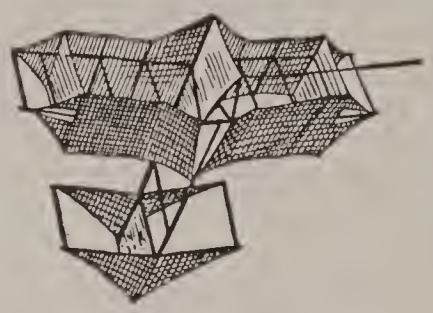


Fig. 1.—Aërocurve Kite.

Fig. 2.—Malay Kite.

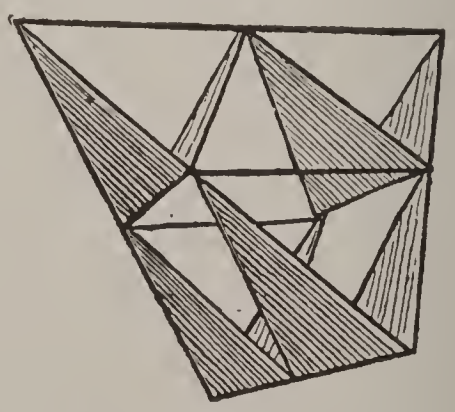


Fig. 3.—Tetrahedral Kite.

Kits Coity House, a dolmen, the best known in England, on a hillside near Aylesford. Three upright blocks of sandstone support a covering stone 12 feet long, forming a chamber. The name is supposed to come from old British words signifying 'the tomb in the wood.' See *Dolmen.*

Kittiwake (kit'i-wāk), a species of gull (*Larus tridactylus*), found in great abundance in all the northern parts of the world wherever the coast is high and rocky.

Kitto (kit'tō), JOHN, was born at Plymouth, England, in 1804; died at Cannstadt, in Germany, in 1854. Losing his hearing, he engaged in literature, producing the *Pictorial Bible, Cyclopedia of Biblical Literature,* etc. Engaged in missionary work at Malta and Bagdad. Pensioned by the crown.

Kitzingen (kits'ing-ĕn), a walled town of Bavaria, 10 miles east-southeast from Würzburg, partly on the right and partly on the left bank of the Main. Pop. 8489.

Kiu-kiang. See *Kew-kiang.*

Kiung-chow (kē-öng'chou'), a seaport of Japan in the island of Formosa, open to foreign trade. Pop. 40,000.

Kiu-Siu (kyö'shö'), one of the three principal islands of Japan, separated from Corea by the Strait of Corea, and from Hondo by the Strait of Sikoku. Its surface is mountainous and there are a number of active volcanoes. It produces coal, copper, tobacco, etc. Nagasaki is situated here.

Kiwi-Kiwi. See *Apteryx.*

Kizil-Irmak (kiz'il-ir-mäk; the Turkish for 'Red River'), a river known to the ancients as the Halys, the principal river of Asia Minor. Rising in the east of the peninsula, it flows in a circuitous route for about 500 miles, and enters the Black Sea near Sinope.

Kizil-Kum (kiz'il-köm), an extensive sandy desert in Asia, to the southeast of Lake Aral, occupying a great part of the space between the Amu Daria or Oxus and the Sir-Daria, in what is now Russian territory.

Kladno (klad'nō), a town of Bohemia, 13 miles N. W. of Prague, with coal and iron mines, iron and steel works. Pop. 18,600.

Klagenfurt (klä'gen-fört), a town of Austria, capital of Carinthia, 40 miles north-northeast of Laibach, on the Glan. Among its public edifices are the cathedral, the town church, the bishop's palace, provincial house of assembly, town house, etc. The manufactures consist of woolens, leather, white lead, etc. Pop. 24,314.

Klapka (klop'ko), GEORGE, a Hungarian general, born in 1820; educated in the artillery school in Vienna, and appointed to a command in 1847. In the Hungarian rebellion of 1848 Klapka joined the revolt as chief of the staff, and in 1849 he took command of an army corps. For the ability which he displayed he was made minister of war by Kossuth. When the Hungarians were defeated, Klapka refused to capitulate, and shut himself up in the fortress of Komorn, where he made a brilliant defense. Ultimately he surrendered under honorable conditions. He was compelled to leave the country, and so passed many of his years in exile. He wrote *Memoirs of the War of Independence* (1850), and *The National War in Hungary and Transylvania.* Died in 1892.

Klaproth (klåp'rōt), JULIUS HEINRICH, a German orientalist and traveler, born in 1783; died in 1835. He traveled through Asia to the Chinese frontier, and also in the Caucasus. Having taken up his permanent residence in Paris in 1815, he was appointed professor of Asiatic languages, and retained this situation till his death. Among his numerous writings may be mentioned his *Description of the Eastern Caucasus, Description of the Russian Provinces Between the Caspian and the Black Seas, Catalogue of the Chinese and Manchu Books and MSS. in the Royal Library of Berlin, Asia Polyglotta* and *Collections of Egyptian Antiquities.*

Klattau (klåt'ou), a town of Bohemia, on a steep height in the beautiful and fertile valley of the Rasenbach, 73 miles S. W. Prague. It is an ancient place, and has six times been almost burned down. Pop. 12,793.

Klausenburg (klou'zĕn-bu̇r*h*; Hungarian *Kolosvár*), an Austrian town, the capital of Transylvania, on the Little Szamos. It has a noble cathedral, and the house where Corvines, Hungary's great king, was born. There are various manufactures. Pop. 42,295.

Klausthal (klous'täl), a town of Prussia, in Hanover, 48 miles S. S. E. of Hanover, the principal mining town of the Hartz. Pop. 8565.

Kléber (klā-bār), JEAN BAPTISTE, a French general, born at Strasburg in 1754, and assassinated in Cairo by a Mohammedan fanatic in 1800. He was one of the ablest of the revolutionary generals, accompanied Napoleon to

Egypt and was left by him as commander-in-chief of the French forces.

Klephts (kleftz), properly *robbers*, the name formerly given to those Greeks who kept themselves free from the Turkish yoke in the mountains, and carried on a perpetual war against the oppressors of their country.

Kleptomania (klep-to-mā′ni-a; Greek *kleptō*, I steal), a supposed species of insanity manifesting itself in a desire to pilfer. In admitting the plea of kleptomania great caution is needed. The best way to arrive at a judgment is to consider the previous character and personal interests of the person charged; to determine the value and usefulness of the article appropriated; the methods of the appropriation and its probable motive. Thus when a baronet steals broken crockery, and a clergyman purloins innumerable cheap Bibles, the ordinary motives for theft are inapplicable, and when the article is taken ostentatiously there is then a strong case in favor of kleptomania.

Klondike (klon′dīk), the region drained by the Klondike River, Canada, in the Arctic Zone. In shape it represents an inverted triangle, the lower point jutting into Alaska. The temperature resembles that of Alaska, but the atmosphere is much drier than the western portion. The summer lasts only from July until the middle of October; during this season the hills are clothed with verdure and trees of spruce, cottonwood, pine, etc., are numerous. The levels are carpeted with a luxuriant growth of Arctic moss. In winter the streams and soil become solidly frozen, being seldom thawed, except the upper strata, even in summer. Under these adverse conditions it brings forth an exquisite flora: the Linnæa, violets, cornel and other wild flowers. Wheat, barley, oats, rye and many vegetables are successfully raised. Mosquitoes, midges and flies infest the country during summer. Alaska and British Columbia have long been known to contain rich deposits of gold. In 1896 gold was discovered in abundance along the Klondike River, and since then this region has yielded profusely, the amount taken being valued at many millions of dollars. It has been estimated that from twelve to twenty millions of dollars have been taken annually from the mines. The severe frosts make the working of the auriferous gravel exceedingly difficult, as it must first be thawed by artificial heat; and water, the great desideratum of the placer-miner, is, from the same cause, very meager in supply. Dawson is the only town in the district, and is the distributing point for the mining region.

Klootz, Anacharsis. See *Cloots*.

Klopstock (klop′stok), Friedrich Gottlieb, a celebrated German poet, was born in 1724; died in 1803. He studied theology, and commenced in solitude the first canto of his sacred epic, *The Messiah*. The three first cantos of this grand and interesting work appeared in 1748, and excited universal attention.

Knapp (nap), Martin Augustine, justice, was born at Spofford, New York, in 1843. Admitted to the New York bar in 1869, he was corporation counsel at Syracuse 1877-83, and was appointed on the Interstate Commerce Commission in 1891, becoming its chairman in 1898. In 1910 he was appointed presiding justice of the Court of Commerce, created by Congress in that year.

Knapsack (nap′sak), a bag of leather or strong cloth for carrying a soldier's necessaries, and closely strapped to the back between the shoulders.

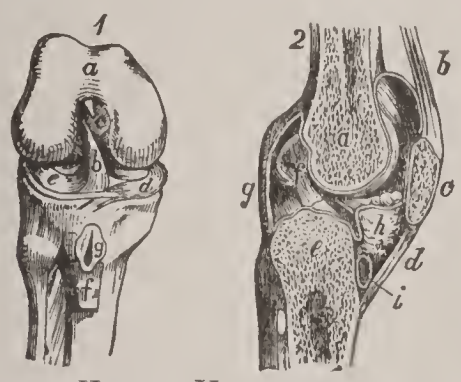
Knapweed (nap′wēd), the popular name given to some species of *Centaurea*. *C. nigra*, black knapweed; and *C. scabiosa*, greater knapweed, are common weeds, being rough, hardy, herbaceous plants growing by waysides, etc.

Knaresborough (närs′bur-o), a town of England, county of York (West Riding), on the left bank of the Nidd, 17 miles west by north of York. The environs of the town abound with objects of interest, including the ruins of the castle, founded in 1170; the dropping well possessed of powerful petrifying properties; and several curious excavations. Pop. 5315.

Knaus (knous), Ludwig, a German painter, born in 1829. He studied at Düsseldorf under Karl Sohn and Schadow, but struck out a path for himself, painting subjects from everyday rustic life. In 1852-60 he lived mostly in Paris, and painted the chief pictures of his first period, *The Golden Wedding*, *The Baptism* and *The Setting-out for the Dance*. In 1861-66 he resided in Berlin, and from 1866 to 1874 he lived in Düsseldorf, and to this period belong some of the pictures on which his fame as a genre painter is most securely founded: *The Children's Feast*, *The Funeral*, *The Goose-Girl*, *Brothers and Sisters*, etc. In 1874 he received an appointment in the Art Academy of Berlin.

Knee (nē), or Knee-joint, that joint in the lower limbs of man which

corresponds to the elbow in the upper, and is formed by the articulation of the femur or thigh-bone with the tibia, or large bone of the leg. The lower end of the femur terminates in two oblong rounded masses, called the *condyles* of the femur, which rest in two cavities in the upper part of the tibia; interposed between the two bones are the *semilunar cartilages*, which diminish the pressure of the femur on the tibia, and prevent the



HUMAN KNEE-JOINTS.

1, Right Knee-joint laid open from the front, to show the internal ligaments. *a*, Cartilaginous surface of lower extremity of the femur, with its two condyles. *b*, Anterior crucial ligament. *c*, Posterior do. *d*, Internal semilunar fibrocartilage. *e*, External fibrocartilage. *f*, Part of the ligament of the patella turned down. *g*, Bursa or sac containing synovial fluid, laid open.

2, Longitudinal Section of the Left Knee-joint. *a*, Cancellous structure of lower part of femur. *b*, Tendon of extensor muscles of leg. *c*, Patella. *d*, Ligament of the patella. *e*, Cancellous structure of head of tibia. *f*, Anterior crucial ligament. *g*, Posterior ligament. *h*, Mass of fat projecting into the cavity of the joint below the patella. *i*, Bursa.

displacement of the former. In front of the knee-joint is the *patella* or *knee-pan*. The joint is capable of flexion and extension, and of a very slight rotatory movement. The accompanying figures and explanations will enable the joint and its chief features to be thoroughly understood. See also *Leg*.

Kneller (nel'ėr), SIR GODFREY, portrait painter, born at Lübeck about 1648; died in London in 1723. He studied under Bol and Rembrandt at Amsterdam, visited Rome, Venice and Hamburg, and gained a good reputation for historical paintings as well as portraits. He came to England in 1684, and succeeded Sir Peter Lely as court painter to Charles II. He filled the same position under James II, William III, Anne and George I. The last named made him a baronet. In addition to all the celebrities of the English court, including the *Ten Beauties of the Court of William*, now at Hampton Court, he painted the 43 members of the Kit-Cat Club, and portraits of ten sovereigns, including Louis XIV and Peter the Great. He was highly praised by Dryden, Pope, Addison and Steele, but his works have more value historically than as works of art.

Knight (nīt), in feudal times, a man admitted to a certain military rank, with special ceremonies. See *Chivalry*. In modern usage one who holds a certain dignity conferred by the sovereign of Great Britain, and entitling the possessor to have the title of *Sir* prefixed to his Christian name, but not hereditary like the dignity of baronet. The wives of knights have the legal designation *Dame* for which *Lady* is usually substituted. See *Knighthood, Orders of*.

Knight, CHARLES, English editor and publisher, born in 1791; died in 1873. He succeeded his father as a bookseller in Windsor, and for a number of years he edited a Windsor newspaper. Having removed to London in 1823 he commenced *Knight's Quarterly Magazine*, which contained the earliest contributions to literature of Macaulay, Praed and others. In 1827 he undertook the superintendence of the publications of the Useful Knowledge Society, for which he did a great deal of valuable work, superintending and publishing the *Library of Entertaining Knowledge;* the *Penny Magazine* and the *Penny Cyclopædia*, afterwards remodeled as the *English Cyclopædia*, etc. Among the many works edited by him the edition of Shakespere is the most esteemed. His *Half Hours with the Best Authors* is very popular. The most important of his own writings, the *Popular History of England*, occupied him seven years, 1854-61. An autobiography, *Passages of a Working Life During Half a Century*, appeared in 1863-65.

Knighthood, ORDERS OF, the name given to organized and duly constituted bodies of knights. The orders of knighthood are of two classes—either they are associations or fraternities, possessing property and rights of their own as independent bodies, or they are merely honorary associations established by sovereigns within their respective dominions. To the former class belonged the three celebrated religious orders founded during the Crusades—Templars, Hospitallers and Teutonic Knights. The other class, consisting of orders merely titular, embraces most of the existing European orders, such as the order of the Golden Fleece, the order of the Holy Ghost, the order of St. Michael. The British orders are the order of the Garter, the Thistle, St. Patrick, the Bath, St. Michael and St. George, the Star of India, and the order of the Indian Empire. The various orders have each their

appropriate insignia, which generally include a badge or jewel, a collar, a ribbon of a certain color, and a star.

Knight Service, the original and most honorable species of feudal land tenure. The holder of a knight's fee, the extent of which is now doubtful, was bound to render military service to his lord for forty days in every year if required. The holder of half a knight's fee attended twenty days, and the holder of smaller fractions in proportion. Knight service was abolished in the reign of Charles II, freehold taking its place.

Knights of Columbus, an American benevolent society, founded in 1882, of Roman Catholic membership, with about 225,000 members.

Knights of Honor. A fraternal benevolent society, founded in the United States in 1873; membership 22,000. Knights and Ladies of Honor, founded in 1877 in the United States, membership 90,000.

Knights of Labor, a labor organization founded at Philadelphia in 1869. Its operations were secret, but its professed object was the amelioration and protection of the laboring classes. Its membership is now much reduced, labor unions and the American Federation of Labor, etc., taking its place. See *Labor Organizations.*

Knights of Pythias, a fraternal society founded in the United States in 1864, to disseminate the principles of friendship, charity and benevolence, apart from sectarianism and politics. Its cardinal principles are toleration in religion, obedience to law and loyalty to government. There are three degrees, called ranks—page, esquire, knight. The endowment rank has for its object the furnishing of a reliable and economical life insurance.

Knights of St. John. See *John (Knights of St.).*

Knights of the Golden Eagle. An association founded in 1873 in the United States, for social and benevolent purposes. It has 86,000 members.

Knights of the Maccabees. An association of benevolent character, founded in 1881. It has in the United States about 300,000 members.

Knights Templars. See *Templars.*

Knitting (nit'ing), an industrial and ornamental art allied to weaving, but of much later origin. It consists in forming a series of loops with a single thread, through which another row of loops is passed, and so on consecutively; differing from crochet in so far as the series of loops are not thrown off and finished successively. In hand-knitting steel wires are used to form the loops on. For manufacturing purposes hand-knitting has been entirely superseded by machinery.

Knolles (nōlz), or KNOWLES, RICHARD, an English historian, born about 1543; died in 1610. He was educated at Oxford, and became master of the free school of Sandwich, in Kent. He wrote a *General History of the Turks* (published in 1603 and 1610), the style of which is highly commended by Johnson, Hallam and other critics, and *Lives and Conquests of the Ottoman Kings and Emperors,* continued to and printed in 1621.

Knot (not), a complication of a thread, cord, or rope, or of two or more threads, cords, or ropes by tying, knitting, or entangling. Knots expressly made as means of fastening differ as to form, size and name according to their uses, as overhand-knot, reef-knot, half-hitch, close-hitch, timber-hitch, fisherman's-bend, carrick-bend, sheet-bend, single-wall knot, double-wall knot, etc. The term knot is also applied on shipboard to a division of the log-line which is the same fraction of a mile as half a minute is of an hour; that is, it is the hundred and twentieth part of a nautical mile; hence, the number of knots run off the reel in half a minute shows the vessel's speed per hour in miles, so that when a ship goes 8 miles an hour, she is said to go 8 *knots.* Hence, the word has come to mean also a nautical mile or 6086.7 feet.

Knot, a grallatorial bird of the family Scolopacidæ and genus *Tringa* (*T. canūtus*), closely allied to the snipe.

Knotgrass, a very common weed of the genus *Polygŏnum* (*P. aviculāre*), remarkable for its wide distribution. It is of low growth, with branched, trailing stems, and knotted joints (whence the name).

Knout (nout), a kind of whip or scourge serving as an instrument of punishment in Russia. It was formerly in use in the army, but a few strokes only are now inflicted, as a disgrace, in case of dismissal. It is still sometimes used for criminals. The nobles were exempted from the knout, but the exemption was not always observed.

Knowles (nōlz), JAMES SHERIDAN, dramatist, born at Cork in 1784; died at Torquay in 1862. He took to the stage in 1798, but meeting with

indifferent success, he devoted himself to teaching, first in Belfast, and afterwards in Glasgow. His tragedy of *Caius Gracchus* was performed in 1815 with success, and from this time he had a prosperous career as author, actor and lecturer. About 1845 he retired from the stage. He became afterwards a Baptist preacher, and published several theological works. In 1849 he received a pension of £200 a year from the government. The following are among his principal works:— *Caius Gracchus, Virginius, William Tell, The Hunchback, The Wife of Mantua, The Love-chase*, and in 1847 and 1849 he published two novels, *Fortescue* and *George Lovell.*

Knox (nokz), JOHN, the chief promoter of the reformation in Scotland, was born at Gifford, in East Lothian, in 1505; died at Edinburgh in 1572. He was educated at the grammar school of Haddington, and at either Glasgow or St. Andrews, and had Dr. John Mair or Major as his philosophical and theological teacher, but did not take the degree of master of arts. He became a secular priest about 1530, and spent about 10 years in a religious establishment in East Lothian. He became an avowed advocate of the reformed faith about 1542, and entered the family of Douglas of Longniddrie as tutor to his sons and those of the laird of Ormiston. In 1546-47 he preached to the beleaguered Protestants in the castle of St. Andrews, and when it was taken by the French, Knox was sent to France with the other prisoners, and put to the galleys, from which he was released in 1549. He passed over to England, and, arriving in London, was licensed either by Cranmer or the Protector Somerset, and appointed preacher, first at Berwick, and afterwards at Newcastle. In 1551 he was appointed chaplain to Edward VI, and preached before the king at Westminster, who recommended Cranmer to give him the living of Allhallows, in London, which Knox declined, not choosing to conform to the English liturgy. It is said that he also refused a bishopric. On the accession of Mary, in 1554, he quitted England, and sought refuge at Geneva, where he had not long resided before he was invited by the English congregation of refugees at Frankfort-on-the-Main to become their minister. A dispute concerning the use of a church service sent him back to Geneva, whence after a residence of a few months, he ventured, in 1555, to pay a short visit to his native country. He again retired to Geneva, where he wrote several controversial and other works, including the *First Blast of the Trumpet against the Monstrous Regimen of Women*, chiefly aimed at the cruel government of Queen Mary of England, and at the attempt of the queen regent of Scotland to rule without a Parliament. A *Second Blast* was to have followed; but the accession of Queen Elizabeth to the throne of England, who was expected to be friendly to the Protestant cause, prevented it. In May, 1559, he returned to Scotland, and immediately joined the Lords of the Congregation. He preached at Perth on the occasion when the inflamed multitude made a general attack on the churches of the city, the altars being overturned, the pictures destroyed, the images broken, and the monasteries almost leveled to the ground. Similar vandalism took place in many other places, but these proceedings were censured by the reformed preachers and by the leaders of the party. Being appointed minister of Edinburgh, he took a prominent part in the proceedings of the Protestant leaders from this time onward, and had the principal share of the work in drawing up the *Confession of Faith*, which was accepted in 1560 by the parliament. In 1561 the unfortunate Mary arrived in Scotland. She immediately began the regular celebration of mass in the royal chapel, which, being much frequented, excited the zeal of Knox, who openly declared from the pulpit, 'that one mass was more frightful to him than 10,000 armed enemies landed in any part of the realm.' This freedom gave great offense, and the queen had long and angry conferences with him on that and other occasions. He preached with equal openness against the marriage of Mary and Darnley, giving so much offense that he was called before the council and inhibited from preaching. In the year 1567 he preached a sermon at the coronation of James VI, when Mary had been dethroned and Murray appointed regent. After the death of Murray, in 1569, Knox retired for a time to St. Andrews. In 1572 he was greatly offended with a convention of ministers at Leith for permitting the titles of archbishop and bishop to remain during the king's minority. At this time his constitution was quite broken, and he received an additional shock by the news of the massacre of St. Bartholomew. He had, however, strength enough to preach against it, but soon after took to his bed and died. He was twice married, first to Marjory Bowes in 1555, and secondly, in 1564, to Margaret Stewart, daughter of Lord Ochiltree. In addition to numerous polemical tracts, letters and sermons, Knox wrote a *Historic of the Reformation of Religion*

within the Realm of Scotland. The best edition of his works is that edited by David Laing (1846-64); the standard biography is McCrie's *Life of Knox.*

Knox, Philander Chase, statesman, born at Brownsville, Pennsylvania, in 1853; was admitted to the bar in 1875, won high estimation for his legal ability, and in 1876-77 was made Assistant U. S. District Attorney for the Western District of Pennsylvania. Resigning this position he continued in law practice until 1901, when he was appointed Attorney General of the United States. In 1904 he was elected U. S. Senator from Pennsylvania and in 1909 became Secretary of State in President Taft's cabinet.

Knoxville (noks'vil), a city, capital of Knox County, Tennessee, an important commercial and manufacturing center at the head of steamboat navigation on the Holston River, 165 miles east of Nashville. It contains the East Tennessee University, the Knoxville University, the State agricultural college, and other educational and literary institutions. It is in a coal, iron, zinc and marble mining region and has extensive manufact ries, including iron and car works, cotton and woolen mills, and various others. Its supply and shipping trade is of importance. Pop. 36,346.

Knoxville, a borough of Allegheny County, Pennsylvania, on the Cowanesque Creek, 60 miles N. of Lock Haven. It has large flour mills and tobacco warehouses, creamery and cheese factories, etc. Pop. 5651.

Koala (ko-ä'lȧ), the native name for a marsupial animal of Australia, commonly referred to the family Phalangistidæ or phalangers. It somewhat resembles a small bear, hence its scientific

Koala (*Phascolarctos cinereus*).

name, *Phascolarctos cinereus* (*Gr. phaskos*, a pouch, and *arktos*, a bear). There is hardly any rudiment of a tail. Its forefeet have five toes, two of which are opposed to the other three. The peculiarity does not extend to the hind limbs. The koala lives much on trees, feeding on the leaves, and often burrowing for roots. It is known by the names of 'native sloth' and 'native bear.'

Kobé, KOBBÉ, KOBBEH (kō'bā), a chief trading town of Darfur, Central Africa, situated on the main caravan route. Pop. 6000.

Kobé, a seaport of Japan, adjoining Hiogo so closely as to form one town with it. It is of more recent origin than Hiogo, and is strictly the port opened by treaty to foreign commerce. Combined pop. 285,002.

Kobold (kō'bold), a species of elf in the popular superstition of Germany, corresponding to the English *goblin*, and the Scottish *brownie.* The kobold is connected with a house or a family, and appears in bodily shape. Though inclined to mischievous teasing, they do on the whole more good than evil to men, except when irritated. They frequent mines as well as houses, and the metal *cobalt* has its name from this spirit.

Kobrin (kob'rēn), a Russian town, government of Grodno, formerly the capital of a principality of the same name. Pop. 10,355.

Koch (kok), ROBERT, an eminent bacteriologist, born at Klausthal, Germany, in 1843. His reputation rests chiefly on his discovery of the bacterial germs of cholera and tuberculosis and his production of tuberculin, a remedy for the latter disease the efficiency of which has not been fully established. He was professor at Berlin in 1885, director of the institute for infectious diseases in 1891, and in 1896 went to South Africa to study the cattle disease. He died in 1910.

Kock, CHARLES PAUL DE, a French novelist, born in 1794; died in 1871. His novels dealt with scenes of low life in Paris and were long very popular.

Kodak (kō'dak), a form of camera adapted to take instantaneous photographs by the 'snap-shot' method. It has the shape of a small box, with a lens and shutter on one side and a reflector on top. When the operator sees the view he wishes in the reflector, he presses a button and an instantaneous negative is taken automatically.

Ko'diak. See *Kadiak.*

Koel. See *Aligarh.*

Kohat (kō-hät'), a town of India, headquarters of district of the same name in the lieutenant-governorship of the Punjab. Pop. including

suburbs and cantonments, 30,762. The district has an area of 2838 square miles. There are rich deposits of rock salt, some petroleum springs and sulphur mines. Pop. 217,865.

Koheleth, COHELETH. See *Ecclesiastes.*

Koh-i-noor. See *Diamond.*

Kohl-rabi (kōl′rä-bi), a cultivated variety of the cabbage, distinguished by a swelling at the neck of the root, which is eaten, and in its qualities much resembles Swedish turnip. It is valuable as a cattle food, and is steadily increasing in use in the United States.

Kohl-rabi.

Kokomo (ko-kō′ma), a city, capital of Howard County, Indiana, 54 miles N. of Indianapolis. It is the principal city in the natural gas district of the State, and has extensive woodworking and plate glass works, paper and pulp mills and other industries. Pop. 17,010.

Kokra Wood (ko′kra), the wood of *Aporosa* or *Lepidostachys Roxburghii,* a tree of the Spudgewort family (Euphorbiaceæ), a native of India, used for musical instruments.

Kola (kō′la), a seaport of Russia, in the government of Archangel, on the Kola, near its mouth in the Bay of Kola; the most northern town in European Russia. Pop. 600.

Kola, COLA (kō′la), a genus of plants belonging to the natural order Sterculiaceæ, a native of western tropical Africa. The *Kola* or *Sterculia acuminata* produces a fruit which consists of two, sometimes more, separate pods containing several seeds about the size of horse chestnuts. The seeds have been found to contain caffeine, the active principle of coffee, as also the same active principle as cocoa, with less fatty matter. A drink prepared from them is largely used in tropical Africa, and is said to have digestive, refreshing and invigorating properties. The tree has been introduced into the West Indies and Brazil. The negroes of Jamaica are said to get rid quickly of the effects of intoxication by using the kolanut. It has been introduced into Britain, manufactured into a paste, or into tablets, and is used as a tonic, but has only an effect like that of coffee or caffeine.

Kolaba (kō-lä′ba), a British Indian district in the southern division of the Bombay Presidency, stretching along the coast southward from Bombay harbor for 75 miles; area, 1872 square miles; pop. 605,566.

Kolapoor. See *Kolhapur.*

Kolar (kō-lär′), a district of the native state of Mysore, Southern India; area, 3059 square miles; pop. 723,600. The chief town, also called KOLAR, is situated 43 miles E. N. E. of Bangalore. Pop. 12,210.

Kolding (kōl′ding), a seaport of Denmark, east coast of Jutland, on the Koldingfjord, an inlet of the Little Belt. Pop. 12,516.

Kolhapur (kol-hä-pör′), a native Indian state, Bombay Presidency; area, 2816 sq. miles; pop. 910,011. —KOLHAPUR, the chief town, is a picturesque, thriving place, held in high esteem for the antiquity of its sacred shrines. Pop. 54,373.

Kolima. See *Kolyma.*

Kollin, or KOLIN (kō′lēn), a town of Bohemia, on the Elbe, 35 miles east by south of Prague. It has manufactures of sugar, chemicals, etc. Frederick the Great was defeated here by Marshal Daun, June 18, 1757. Pop. 15,025.

Köln. See *Cologne.*

Kolomea (kō-lō-mā′a), a town of Austria, in Galicia, 108 miles S. S. E. Lemberg, on the right bank of the Pruth. Petroleum refining, pottery, etc., occupy the inhabitants. Pop. 34,188.

Kolomna (ka-lom′na), a town of Russia, in the government of and 60 miles southeast of Moscow. It has manufactures of woolen, linen, soap, etc., and an important trade. Pop. 20,970.

Kolyma (ka-li-må′), a river of Eastern Siberia, which rises in the Stanovoi Mountains, and after a course of nearly 1000 miles falls into the Polar Sea.

Komorn (kō-morn′), the capital of the county of Komorn, in

Hungary, at the confluence of the Danube and Waag, with some manufactures and a considerable trade. There is here a very strong fortress which has been repeatedly besieged. During the Hungarian insurrection of 1848-49 it was besieged by the Austrians in vain, but was surrendered by capitulation. Pop. 20,264.

Komura, JUTARO, Baron, a Japanese statesman, was born in 1858. He studied at Harvard Law School and became a judge in Japan. In 1902, as Foreign Minister, he effected the Anglo-Japanese alliance. In 1905 he was the chief Japanese plenipotentiary in the Russo-Japanese Peace Convention at Portsmouth, New Hampshire.

Kong Mountains, a range of little known heights in West Africa extending in a W. to E. direction at a distance of about 200 miles north from the Gulf of Guinea. Tributaries of the Niger have their sources in these mountains.—The town of KONG lies at the eastern end of the chain, and is the center of several caravan routes.

Kongo Free State. See *Congo Free State.*

Konia (kō'nē-ä), or KONIEH (ancient *Iconium*), a town of Asiatic Turkey, pashalic of Karamania, in the center of an extensive plain. It has an imposing appearance from a distance, but its interior is in a ruinous condition. The inhabitants are chiefly employed in making carpets and in preparing leather, cotten, wool and hides. Pop. 45,000.

Königgrätz (k*eu*'nih-grāts), a town of Bohemia, on the left bank of the Elbe, at the confluence of the Adler, 64 miles E. N. E. of Prague. It is the see of a bishop, and contains an ancient cathedral. The battle of Sadowa was fought in the vicinity on July 3, 1866. Pop. 9773.

Königinhof (k*eu*'ni-gin-hōf), a town of Bohemia, 14 miles N. N. W. of Königgrätz, on the Elbe. Pop. 11,000.

Königsberg (k*eu*'nīhs-berh), a fortified seaport town of Prussia, capital of the province of East Prussia, on the Pregel, about 4 miles above where it enters the Frisches-Haff. It consists of three main parts—the *Altstadt*, or Old Town, situated on the west; *Löbcnicht* on the east (both north of the Pregel), and *Kneiphof*, situated on an island formed by the Pregel, besides extensive suburbs south of the Pregel. Between the Altstadt and Löbenich is the Schlossteich, a fine sheet of water. The principal buildings are the cathedral, a Gothic structure, begun in 1333, restored in 1856, situated in the Kneiphof; the schloss, or palace, begun in 1255, formerly the residence of the grand-masters of the Teutonic order, and now containing apartments for the royal family, government offices, etc.; the schlosskirche, or palace church, occupying a wing of the palace; the new university, completed in 1862; the old university; the exchange, a fine modern building; the city museum, theater, etc. The university, founded in 1544 by the Margrave Alber, is attended by 800 to 900 students, and has connected with it a library of 220,000 vols., a zoological museum, and other valuable collections. The manufactures of Königsberg are various. The chief trade is in grain, flax and hemp, timber, tea, etc. Owing to shallow water the larger vessels bound for Königsberg land at Pillau, which is accordingly considered its port. The fortifications surround the city on all sides, and are now very strong. Königsberg entered the Hanse League in 1365. It suffered much during the Seven Years' war by the occupation of the Russians from 1758 to 1764, and much more severely from the French, who entered it in 1807, after the battle of Friedland, and laid it under heavy contribution. Pop. 245,853.

Königsberg, a town of Prussia, province of Brandenburg, 41 miles north of Frankfort-on-the-Oder. Pop. 5958.

Königshütte (k*eu*'nihs-hût-ė), a town of Prussia, province of Silesia, 49 miles E. S. E. of Oppeln. The inhabitants are chiefly employed in iron-working and mining, coal and iron being raised in large quantities, and also zinc. Pop. 57,919.

Königsmark (k*eu*'nihs-mârk), MARIA AURORA, COUNTESS, born at Bremen in 1670; died in 1728. She was celebrated for her beauty and mental accomplishments; became the mistress of Frederick Augustus, elector of Saxony and king of Poland, and mother of Maurice of Saxony (Marshal Saxe), the celebrated French general. She was extravagantly esteemed by Voltaire.

Konrad. See *Conrad.*

Koodoo (kö'dö; native name), the striped antelope (*Antilŏpe strepsiceĕros*, or *Strepsicĕros koodoo*), a native of South Africa, the male of which is distinguished by its fine horns, which are nearly 4 feet long, and beautifully twisted in a wide spiral. The koodoo is of a grayish-brown color, with a narrow white stripe along the back, and eight or ten similar stripes proceeding from it down either side. It is about 4 feet in height, and fully 8 in length.

Kookas (kö'käz), a nigritic tribe of the central Soudan, east of Lake Chad.

Koom. See *Kum.*

Koordistan. See *Kurdistan.*

Kooria Mooria Islands, a group of five islands on the southeastern coast of Arabia, belonging to Great Britain. There was formerly a considerable deposit of guano on the largest island, but it was not of very good quality. It is now exhausted.

Kopek. See *Copeck.*

Koran (kō'ran; *Al-Korân*, that is *the Koran*, which means originally 'the reading, or that which is to be read'), the book containing the religious and moral code of the Mohammedans, and by which, indeed, all their transactions, civil, legal, military, etc., are regulated. According to the Mohammedan belief, it was written from the beginning in golden rays on a gigantic tablet in the highest heavens, and portions were communicated by the angel Gabriel to Mohammed at intervals during twenty-three years. These were dictated by Mohammed to a scribe and kept for the use of his followers. After Mohammed's death they were collected into a volume, at the command of Mohammed's father-in-law and successor, Abu Bekr. This form of the Koran, however, was considered to contain erroneous readings, and in order to remove these Caliph Othman caused a new copy to be made from the original fragments in the thirtieth year of the Hejra (625 A.D.), and then ordered all the old copies to be destroyed. The leading doctrine of the Koran is the Oneness of God, clearly laid down in the symbol of the Moslem—'God is God, and Mohammed is his prophet.' To Christ it assigns a place in the seventh or highest heaven, in the immediate presence of God, but he is simply regarded as one of the prophets—Adam, Noah, Abraham, Moses, Jesus and Mohammed. The doctrines of good and bad angels, and of the resurrection and final judgment, are fully set forth, as is also God's mercy, which secures entrance into heaven and not the merits or good works of a man. The joys of heaven range from music and women to the supreme joy of beholding God's face, while the pains of hell are depicted in vivid colors. Idolatry and the deification of created beings are severely condemned. Another dogma is set forth in the Koran, yet not explicitly, that of the unchangeable decrees of God. Mohammed used the doctrine of predestination with great success to infuse into his adherents undaunted courage, which elevated them above all perils. The Koran prescribes prayer, fasting, alms, and the pilgrimage to Mecca and Mount Arafat. The great fast is that of Ramadan (which see). He prescribed prayer five times a day with the face turned towards Mecca. Purification must precede prayer, and where water is unattainable dry dust or sand may be used. To give alms was always a particular trait of the Arabians, but Mohammed made it obligatory. The pilgrimage or something similar had existed with most sects before him. In respect to the civil laws relating to polygamy, divorce, inheritance, etc., Mohammed followed step for step the laws of Moses and the decisions of the rabbis, only adapting them to the customs and prejudices of his countrymen. The Koran is written in prose, but the different parts of a sentence end in rhymes. In size it is about equal to the New Testament; it is divided into 114 *surahs* or chapters of unequal length, each of which begins with the phrase, 'In the name of God.' As the work was written at different times, in different moods, and on different occasions, there is naturally great diversity in the style of different passages. The language is considered the purest Arabic. It is, however, very different from the spoken Arabic of modern times. Commentaries on the Koran are exceedingly numerous.

Kordofan (kor-dō-fän'), a country of Africa, in the Eastern Soudan between Darfur and the Nile. From 1821 to 1883 it formed one of the Soudanese provinces of Egypt, but at the latter date it was freed from Egyptian rule through the Mahdi's insurrection, and has since been virtually independent. The surface is generally flat and the soil naturally fertile. The climate in the wet season, lasting from June to October, is extremely unhealthy; in the dry season, though healthy, it is intolerably hot. The principal articles of trade are gum, hides, senna, ivory, cattle, gold, salt, slaves, etc. Cultivation is almost wholly confined to duchn, a species of millet. The inhabitants consist of negroes, Arabs, etc. Pop. estimated at 550,000. The chief town is El Obeid. Pop. about 10,000.

Korea. See *Corea.*

Kornegallé (kor-nā-gäl'le), a town of Ceylon, 55 miles N. E. of Colombo. It was formerly a capital, and has an ancient temple, a great resort for Buddhist pilgrims, on account of a footprint of Buddha being hollowed in the rock. Pop. 4000.

Körner (keur'nêr), KARL THEODOR, a German poet, born at Dresden in 1791; killed in 1813. He wrote the tragedies of *Rosamunde* and *Zriny*, and a large number of dramas for the Theater Royal at Vienna, but owes his fame to his celebrated patriotic lyrics, which are all national in Germany. In 1813, when Germany took up arms against Napoleon, Körner joined the famous Lützow corps of black hussars, and was fatally wounded in a skirmish fought in the neighborhood of Gadebusch, in Mecklenburg-Schwerin. The collection of songs published soon after his death as *Leier und Schwert* ('Lyre and Sword') contains some of the finest war-songs in any language.

Körös (*keu'reu*sh), NAGY (nâdy), a town in Hungary, 47 miles southeast of Budapest. It contains a number of handsome buildings, and has a considerable trade in wool and cattle. Pop. 26,512.

Korvei. See *Corvey*.

Kosciusko (kos-si-us'ko, or kosh-tsyu̧sh'kō), THADDEUS, Polish patriot, was born in Lithuania of an ancient and noble family in 1746, and died at Soleure (Solothurn) in 1817. He was educated in the military school at Warsaw, and was afterwards sent at the expense of the state in the capacity of sublieutenant to complete his studies in France. On his return to Poland he became tutor to the daughter of Gasnovski, marshal of Lithuania, but having conceived a passion for his pupil, and being disappointed in his suit, he quitted his native country and betook himself to America (1776), where he attracted the notice of Washington, was appointed by him engineer, with the rank of colonel, and afterwards general of brigade. He did not return to Europe till three years after the conclusion of the Peace of 1783. For some years after his return he lived in retirement, but after serving in his own country under Poniatovski, he was appointed in 1794 generalissimo of the insurgent forces. He defeated the Russians at Raclavice, near Cracow, but at the battle of Maciejovice his army was defeated and he himself wounded and taken prisoner. He remained in captivity for two years, but was liberated on the accession of Paul I of Russia in 1796. After visiting England and America, he ultimately settled at Soleure in Switzerland, where he continued to live in quiet retirement. In 1817 he issued from here a letter of emancipation to the serfs on his estate in Poland. In 1818 his body was removed at the expense of the Emperor Alexander of Russia to Cracow, where it was buried in the cathedral, and where a monument was erected to him. A mound 150 feet in height, formed of earth from all the principal battlefields of Poland, was also raised to his memory in the vicinity of Cracow.

Kosciusko, MOUNT, one of the highest mountain peaks in Australia, in the Muniong Alps, in New South Wales, near the frontier of Victoria; 7308 feet high.

Kosel (kō'zel), a fortified town of Prussia, province of Silesia, 24 miles S. S. E. of the town of Oppeln, on the Oder. Pop. 7087.

Kosi. See *Coosy*.

Köslin (keus'lin), a town in Prussia, province of Pomerania, 4 miles from the Baltic, and 85 miles northeast of Stettin. It is regularly built, and has manufactures of paper, soap, etc. Pop. 21,474.

Koslov (kaz-lof'), or KOZLOV, a town in Russia, in the government of Tambov, and 52 miles W. S. W. of the town of Tambov. It has a considerable trade in cattle, several important annual fairs, and manufactories of woolens, linens, etc. Pop. 40,347. See also *Eupatoria*.

Kosmos. See *Cosmos*.

Kosseir (kos-sar'), a seaport of Egypt on the Red Sea, formerly of considerable importance. Pop. 1500.

Kosso. See *Cusso*.

Kossuth (kosh'shu̧t), LAJOS (LOUIS), Hungarian patriot, born at Monok in the county of Zemplin, Hungary, in 1802. He studied law, and in 1832 entered the Presburg Parliament. For persisting in publishing the debates of the diet, he was condemned to four years' imprisonment. In 1841 he became editor of the *Pesth Journal*, and in 1844 he founded a national league in opposition to the Viennese government. In 1847 he was elected to the diet by the national party, and secured the appointment of a responsible Hungarian ministry, in which he became minister of finance. During the Hungarian war for liberty he was chosen governor or dictator, but the intervention of Russia rendered all the efforts of the Hungarians unavailing. Kossuth resigned, was succeeded by Görgey whom he accused of treachery, and was interned in Turkey. He was released through the intervention of Britain and the United States; visited these countries and met with an enthusiastic reception. He was long regarded as the leader of the Irreconcilable party, but in 1884 he became

reconciled to the Hapsburg rule. His chief residence was in his later years in Italy. He died in 1894.

Kostroma (kås-trå-må′), an inland government of Russia, area, 32,480 square miles. The surface consists of wide level plains, occasionally varied by general acclivities. Hemp and flax are largely grown, and the industries include the manufacture of silver and copper wares, leather, chemicals, etc. The forests are extensive. Pop. 1,596,700.—KOSTROMA, the capital, stands on a height near the confluence of the Kostroma with the left bank of the Volga, 56 miles east of Jaroslav. It is an ancient place, and has a fine old cathedral situated in the Kremlin or former citadel. Pop. 41,268.

Kotah (kō′tä), an Indian native state in Rajputâna, under the political superintendence of a British agent. Area, 3777 square miles; pop. 544,879.—KOTAH, the chief town, is situated on the river Chambal, and has a pop. of 33,679.

Köthen. See *Coethen.*

Koti, a river and Dutch settlement on the east coast of Borneo.

Kottbus (kot′bös), a town in Prussia, provice of Brandenburg and government of Frankfurt, on the Spree, 65 miles S. E. of Berlin. It is a busy manufacturing town. The chief manufactures are woolen cloth and yarns, linen, hosiery, tobaccos, toys and carpets. There are also distilleries and breweries. Pop. 39,327.

Kotow (ko′tou), the ceremony of prostration and striking the forehead nine times on the ground, performed before the Emperor of China. Lord Amherst, in 1816, was the first envoy who refused to perform this ceremony, and the point then made was conceded by the Chinese in the treaty of 1856.

Kotzebue (kot′ze-bö), AUGUST FRIEDRICH VON, a prolific German dramatist and miscellaneous writer, born at Weimar in 1761; assassinated at Mannheim in 1819. In 1781 he went to St. Petersburg, where, obtaining the patronage of the empress, he was made governor of Esthonia and ennobled. About 1800 he returned to Germany, and attacked Goethe and other great German authors who had refused to associate with him. In 1806 he went again to Russia, and lived from 1807 on his estate Schwartze, in Esthonia. In 1813, as counselor of state, he followed the Russian headquarters, constantly writing to excite the nations against Napoleon. In 1817 he received a salary of 15,000 roubles, with directions to reside in Germany, and to report upon literature and public opinion. Kotzebue, who during the whole campaign had written in favor of the Russians, even at the expense of his native country, and had expressed the utmost contempt for liberal principles and institutions, was now odious in the eyes of most of his countrymen, and regarded as a spy. This feeling was so strong in the case of a young enthusiast named Sand that he assassinated him as a traitor to liberty. He wrote more than 100 plays, a history of Germany and other works, most of which are now forgotten. Two of his plays, *The Stranger* and *Pizarro*, are well known on the recent stage.—His son, OTTO, born in 1787; died in 1846, made three voyages round the world, and discovered several islands in the Pacific.

Kouba. See *Kuba.*

Koumiss (kö′mis), or KUMISS, a preparation of milk, whether cow's, mare's, ass's, goat's, which is said to possess wonderful nutritive and assimilable properties. It consists essentially of milk in which alcoholic fermentation has been developed. On the Asiatic steppes, where it has been long used as a beverage, it is made of mare's milk; but koumiss of mare's milk or goat's milk has a somewhat unpleasant smell.

Koursk. See *Kursk.*

Koussa, Kosso. See *Cusso.*

Kovno (kov′nō), a town in Russian Poland, in the government of the same name, of which it is the capital, 52 miles W. N. W. Vilna, on the left bank of the Niemen or Memel. The population, a great part of which consists of Jews, is 73,743.—The government has an area of 15,602 square miles, and its population is 1,683,600.

Kowloon. See *Cowloon.*

Kraal (krål), a South African native village or town, usually a collection of huts surrounded by a palisade. Sometimes the term is applied to a single hut.

Kraguyevatz (krå-gö-yå′vats), a town of Servia, on the Lepenitza, with a cannon and small arms factory, powder-mill and arsenal. Pop. 14,160.

Krakatoa (krä-kå-tō′a), a small uninhabited volcanic island situated in the Sunda Straits, about equally distant from Java and Sumatra. Previous to the eruption of 1883 it measured 5 miles in length and 3 in breadth, and culminated in two elevations, the highest of which was known as the Peak

of Krakatoa, and rose to a height of some 2750 feet above the sea-level. Krakatoa was the scene of an eruption in 1680, but since that time its history was uneventful till the disastrous eruption of 1883. In May of that year intimations of volcanic activity were observed, and on August 27th a gigantic explosion took place which actually blew away a large part of the mountain, and entirely altered the physical features of the island and the neighboring coasts. An immense wave swept over the shores of the neighboring islands occasioning a loss of life variously estimated at from 15,000 to 50,000. To the north two new islands appeared where the morning previous there had been from 30 to 40 fathoms of water. An interesting result was the fact that for several years afterwards remarkably red sunsets were common in the United States, ascribed to volcanic dust from Krakatoa, which had spread in the upper atmosphere around the earth.

Kraken (krā'kn), the term, of Norwegian origin, applied to a fabulous sea-monster, generally assumed to be a gigantic Cephalopod or cuttle-fish. It was first described by Pontopiddan, bishop of Bergen in Norway, but other old writers have accounts of substantially the same kind of monster. It is described as of enormous size; rising from the sea like an island about 1½ miles in circumference, with enormous mast-like arms with which it wrecked ships, created whirlpools, and realized all that was prodigious and strange in size, habits and appearance. The kraken stories are much akin to the modern accounts of the great sea-serpent. Naturalists are chary of accepting any but trustworthy evidence, yet recent researches and discoveries would seem to indicate that very large members of the cuttle-fish group do certainly exist, and that, from analogy, largely-developed forms of other marine classes may occasionally be found.

Kranach, Lucas. See *Cranach.*

Krapotkine. See *Kropotkine.*

Krasnoiarsk (krås-nā-yårsk'), 'the Town on the Red Cliff'), a town in Siberia, capital of the government of Yenisseisk, at the junction of the Yenissei and Katcha. Manufactures of leather, etc., are carried on by artisan convicts, and there are also some gold-washings in the neighborhood. Pop. 27,300.

Krasnovodsk (krås-nå-vådsz'), Russian fortress on the eastern shore of the Caspian Sea, lat. 40° N. It has been the starting-point of many important scientific and military expeditions to Central Asia.

Krayova (kra-yō'va), a town in Roumania, situated near the Schyl, capital of the administrative district of Dolshi. It has an active trade, particularly in salt from mines in the vicinity. Pop. 40,000.

Kreasote. See *Creasote.*

Krefeld (krā'felt), a town in Rhenish Prussia, in the government of Düsseldorf and 12 miles northwest of the town of Düsseldorf. It is the principal locality in Prussia for the manufacture of silks, velvets and mixed silk goods. There are also manufactories of woolen, linen and cotton cloth, wax-cloth, hosiery, soap, candles, paper, leather, chemical products and tobacco. Pop. 109,119.

Krementchug (krem-en-chök'), a town in Russia, government of Poltava, 67 miles southwest of the town of Poltava, on a sandy plain on the left bank of the Dnieper, here crossed by a magnificent tubular railway-bridge. It has a considerable trade in salt, tallow and timber. Pop. 58,648.

Kremlin (krem'lin; Russian, *kreml*), a fortress, in Russia the citadel of a town or city; specifically applied to the ancient citadel of Moscow. See *Moscow.*

Kremnitz (krem'nitz), a town in Northwestern Hungary, 15 miles north of Schemnetz, with gold and silver mines, which are wrought to a considerable extent, in the vicinity. Pop. 10,000.

Kremsier (krem'sēr), an Austrian town, province of Moravia, on the March, 25 miles S. W. of Olmütz. It contains a palace of the archbishop of Olmütz, a picture gallery, and manufactures iron, sugar and beer, with an active trade. Pop. 13,991.

Kreutzer, Kreuzer (kroit'sėr), an old South German copper coin, equal to the sixtieth part of the gulden or florin, or about a third of a penny. The Austrian current coin bearing this name is the hundredth part of a florin, or equivalent in value to two-fifths of a cent.

Kreuznach (kroits'nå*h*), a town in Rhenish Prussia, district of Coblentz, on the Nahe, 21 miles southwest of Mayence. There are valuable mineral springs containing bromine and iodine, which are much resorted to for their curative properties in scrofulous and other complaints. Marble polishing, wine-growing and the manufacture of leather are among the chief industries. Pop. 21,321.

Kriegspiel (krē*h*′spēl; war-game), a game of German origin, played with maps on a large scale, and colored metal blocks, on the same scale

Holy Gate, Kremlin, Moscow.

as the map, representing bodies of troops of various strength (brigades of infantry, battalions of rifles, regiments of cavalry, besides artillery, engineers, pontoon troops, telegraph troops, etc.). The players are usually two on each side, and the game forms an exact miniature of tactical operations. It is played by alternate moves. Each move represents the lapse of two minutes, and rules are given to determine the distance that each branch of the service may move over in that time. When two bodies of men on opposite sides come into contact, the weaker in numbers and position is held to be defeated; but when they are equal in these respects victory is determined to one side or the other by the use of a die. The game is a favorite one in the German army, and has been adopted to a certain extent in that of Britain.

Kriloff (krē-lof′), or Krylow, Ivan Andreyevitch, a Russian fabulist, born at Moscow in 1758; died at St. Petersburg in 1844. His first compositions were dramas, which were not successful. In 1809 his first collection of fables was published, which, meeting with instant favor, have continued to be the delight of all ages and classes in Russia, many sentences in them having become popular proverbs. They have been translated into German, French, Italian and English. From 1812 to 1841 Kriloff held a post in the St. Petersburg Imperial Public Library.

Krimmitzschau (krim′mit-shou), a busy manufacturing town in Saxony, 37 miles south of Leipzig, on the Pleisse, with woolen spinning and weaving, etc. Pop. 22,840.

Kris (krēs), or Krees, the dagger or poniard forming the universal weapon of the inhabitants of the Malay Archipelago. There are many forms of it, short and long, with straight or serpentine blade, and with every variety in the shape and ornamentation of the hilt and scabbard.

Krishna (krish′na), in Hindu mythology, the eighth avatar of Vishnu and the most popular deity in the Hindu pantheon. He was ostensibly the son of Vasudeva and Devaki of the royal family of the Bhoja reigning at Mathura. The reigning prince at the time of his birth was Kansa, who, to prevent the fulfillment of a prophecy, sought to destroy the young child, but his parents, assisted by divine power, succeeded in baffling all his efforts. Every year of his life furnishes the subject of some legend, his

Krishna.

story showing a remarkable resemblance to those of the Greek Heracles and Apollo. After a series of amorous and heroic exploits, detailed at length in the Puranas, he slew Kansa, mounted the throne, and was at last killed by the arrow of a hunter, shooting unawares in a thicket.

Krishnagar (krish-nag'ar), a town of Hindustan, administrative headquarters of Nadiya district, Bengal, on the left bank of the Jalangi River. It has a college affiliated with the Calcutta University, a collegiate school, a considerable trade, and manufactures of colored clay figures. Pop. 24,547.

Kriss-Kringle, a corruption of German *Christ kindlein* (Christ child). It is another name for Santa Claus, or St. Nicholas, the good genius of Christmas, who has the credit of filling the children's stockings in that happy season.

Kronos. See *Cronus.*

Kronstadt. See *Cronstadt.*

Kroo, Kru, a native race of the w. coast of Africa, much employed in doing rough work on vessels trading on the Liberian coast. Their territory extends about 70 miles along the coast; they are a stout, brawny race and very industrious.

Kropotkine (kro-pot'kēn), Prince Peter Alexeievitch, a Russian anarchist, born at Moscow, in 1842. As attaché for Cossack affairs to the governor of Eastern Siberia he made numerous journeys in Siberia and Manchuria; was made secretary of the St. Petersburg Geographical Society, and wrote several esteemed scientific books. In 1871 he joined the International Society, and began working his revolutionary ideas in Russia. He was condemned to three years' imprisonment, but made his escape and took up residence in Switzerland. Here he founded his anarchist newspaper *La Révolté.* Expelled from Switzerland, he took refuge in France, and was, in 1883, condemned to five years' imprisonment for complicity in outrages at Lyons, but was pardoned in 1886, when he went to England. He is an eloquent speaker and fluent writer, and has contributed several important articles to the *Encyclopædia Britannica,* and to leading British periodicals. He is the author of *The State, its Part in History; In Russian and French Prisons, Paroles d'un Révolté,* etc.

Krossen (krōs'en); a town in Prussia, on the Oder, in the province of Brandenburg. Pop. 7367.

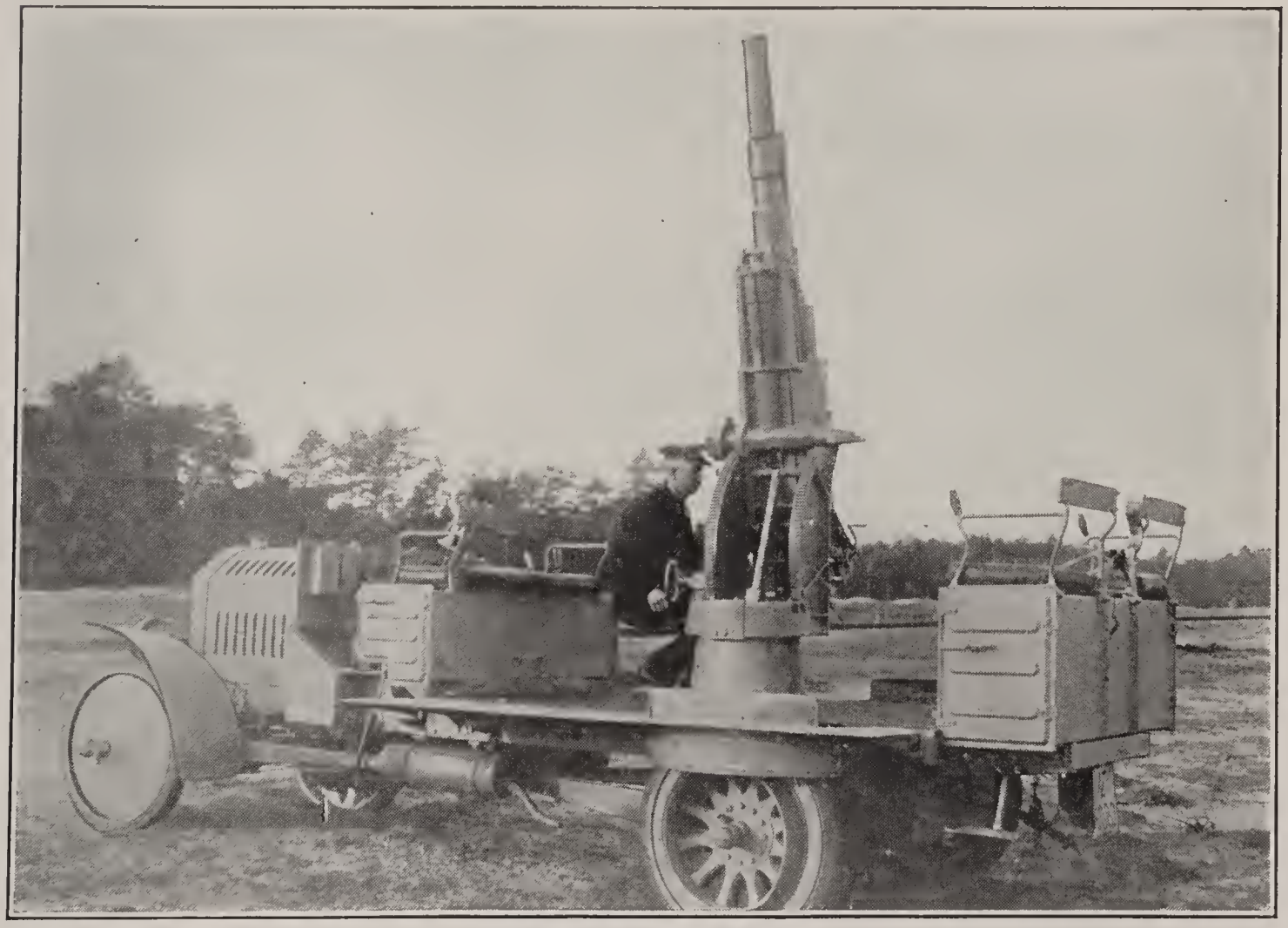
Kruger (krüg'er), Stephen J. Paul, formerly president of the South African Republic, born at Rastenburg, Cape Colony, in 1825. In 1839 he emigrated to the Transvaal region; in 1888 was elected president, and was subsequently reëlected in 1893 and 1898. In 1877, when Britain annexed the Transvaal, he became a British official. He took an active part in the outbreak that followed and which ended in the independence of his country in 1881. He was President of the Republic when it declared war against Britain in 1899, and left Africa in 1900, during the war, to seek support for the Boer cause in Europe. Failing in this, he took up his residence in Holland, where he died July 14, 1904. He was known familiarly as 'Oom Paul.'

Krupp (krup), Alfred, a German engineer and iron manufacturer, born at Essen in 1812; died in 1887. He succeeded his father as proprietor of a small metal foundry at Essen, which he gradually developed to an enormous extent. He discovered a new method of

Alfred Krupp.

casting steel in large masses, which he exhibited in 1851. This led him to the manufacture of heavy steel ordnance, and especially to the construction of heavy breech-loading guns of a type invented by himself, the first of these being produced in 1864. Great improvements were subsequently effected, and the size immensely increased. Though his name is popularly associated with the manufacture of these large guns, the extensive works at Essen turn out also immense quantities of gun-carriages, shot, boiler-plates, axles, wheels, rails, screw-shafts

BALLOON DESTROYED BY A SHOT



KRUPP BALLOON GUN

The use of balloons and aeroplanes in warfare for taking observations and directing firing by means of wireless telegraphy has been followed by a gun capable of destroying them. The Krupp automobile gun shown here is used by the German army. The upper view shows a balloon destroyed by a shot from this gun.

for steamers, etc. He was frequently called the 'Cannon King.'

Krushite (krush'īt), an abrading material consisting of chilled cast-metal shot, made in very small sizes, down to a fine powder. Being very hard and tough, it is used as a substitute for sand in the sand-blast and in tumbling barrels, also for sawing and polishing stone and in making diamond drills.

Krypton (krip'tun), a chemical element discovered in 1898 by Professors Ramsay and Travis, as a gas that rises from liquid air. It is of the helium series, density 22.5, and monatomic. It is one of the recently discovered rare atmospheric gases.

Krylov (krē-lof'). See *Kriloff.*

Kshatriya (shat'ri-ya), the second or military caste in the social system of the Brahmanical Hindus, the Brahmans being first and the Vaisya and Sudra the third and fourth. The natural duties of the Kshatríya are bravery, generosity, rectitude and noble conduct generally.

Kuba (kö'ba), a town in Russia, in the Caucasian government of Baku, district of Kuba, 47 miles S. S. E. Derbend. Pop. 15,346.

Kuban (kö-bản'y'), a Russian territory in the Caucasus, bordering on the Sea of Azov and the Black Sea. Area, 36,251 sq. miles; pop. 2,275,400. The chief river is the Kuban, which rises in Circassia, at the foot of Mount Elbruz, flows first north, then northwest, and ultimately due west, and falls, after a total course of about 400 miles, into the Black Sea at the Bay of Kuban, near the Strait of Kertch.

Kûblai Khan (kö'blā), more properly KHUBILAI KHAN, a Mongol emperor and founder of the twentieth Chinese dynasty, that of the Mongols or Yuen; was born in 1214; died in 1294. In 1259 he succeeded his brother as Grand Khan of the Mongols, and in 1260 he conquered the whole of Northern China, driving out the Tartar or Kin dynasty. He then ruled over the conquered territory himself, and nineteen years later added to it Southern China, driving out the Tartars from the north. Kûblai thus became sole ruler of an empire extending over a large part of Asia, as well as over those parts of Europe that had belonged to the dominions of Genghis Khan. Marco Polo, who lived at the court of this prince, describes the splendor of his court and entertainments, his palaces and hunting expeditions, his revenues, his extraordinary paper currency, his elaborate system of posts, etc. Kûblai Khan is the subject of a poetical fragment by Coleridge.

Kuch Behar. See *Cooch Behar.*

Kuching (kụ-ching'), the capital of Sarawak, on Sarawak River, Borneo, and now known as Sarawak, contains the residence of the rajah and those of several European merchants. It has forts, barracks, a courthouse, prison, etc.; a considerable trade, and a pop. of about 30,000.

Kuenen (kü'nen), ABRAHAM, a Dutch Biblical scholar, was born at Haarlem in 1828. He became professor of Hebrew and the Old Testament at the University of Leyden in 1855. He published in 1861-65 *An Historical Inquiry into the Origin and Collection of the Books of the Old Testament*, which has exerted a decisive influence on Biblical scholars. He was also the author of *The Religion of Israel, The Prophets and Prophecy in Israel, Natural Religions and Universal Religions* (Hibbert Lecture), etc. He was one of the leaders of the reconstructive school of modern Biblical criticism. He died in 1891.

Kuen Lun (kwen-lön'), a mountain range of Central Asia, stretching over a space of about 1500 miles, and forming in its whole length the north frontier of Tibet, as the Himalaya does that of the south. Several of the summits reach an altitude of over 28,000 feet, and the numerous elevated branches which stretch towards the Indus form valleys down which immense glaciers descend.

Kufic Writing. See *Cufic.*

Kuhhorn (kö'horn), same as *Alpenhorn.*

Kuhn (kön), ADALBERT, a German philologist, born in 1812; died in 1881. He made important contributions to comparative philology, and is regarded as the founder of the science of comparative Indo-Germanic mythology. He edited for a number of years the valuable *Zeitschrift für Vergleichende Spraehforsehung* ('Journal of Comparative Philology').

Kuka (kö'kä), or KUKAWA, a town in Western Africa, the capital of Bornou, about 20 miles west from the southwest shores of Lake Chad. Pop. (estimate), 60,000.

Ku-Klux Klan (kö-kluks-klan), a secret society of a sociopolitical nature, which arose after the American Civil war and was bitterly opposed to the reconstruction measures which the government enacted and to the position then occupied by the late slaves. Its membership at one time spread over

nearly all the States of the South, and committed many acts of violence, even murder and arson. Strong measures were taken for the suppression of the society in 1871, and it soon after died away.

Kulbarga. See *Gulbarga.*

Kuldja, or KULJA (köl'jä), a city of Central Asia, in the Chinese territory Dzoungaria, on the right bank of the Ili River, an important caravan center. The district was taken possession of by the Russians in 1871, but retroceded to China in 1881. Pop. 12,500.

Kulm (kụlm).—1. A town of Prussia, province of West Prussia, 33 miles southwest of Marienwerder, on the Vistula. It has manufactures of woolen cloth and a trade in cattle. Pop. 11,665. —2. A village in Bohemia, about 9 miles northeast of Teplitz, where, on the 29th and 30th August, 1813, a great battle was fought, in which the allies under Barclay de Tolly totallv destroyed the French army under Vandamme.

Kum, or KOOM (köm), a town of Persia, 78 miles S. W. of Teheran, formerly a place of great magnificence, but destroyed by the Afghans in 1722. Pop. about 30,000.

Kumaon, or KUMAUN (kö-mä'ön), a British district of Northern India, in the Northwest Provinces, belonging to the Himalayas. Area, 6000 sq. miles; pop, 493,641. The district is generally mountainous, but has important and valuable tea plantations. The capital is Almora, and there are two hill stations, Naini-Tal and Ranikhet. It forms with the districts of Garhwal and Tarai the division or commissionership of Kumaon, which has an area of 13,703 sq. miles, and a pop. of 1,207,030.

Kúmpta. See *Coomptah.*

Kumquat (kum'kwat), a very small variety of orange-tree (*Citrus japonica*) growing not above 6 feet high, and whose fruit, of the size of a large gooseberry, is delicious and refreshing, having a sweet rind and an acid taste. It is a native of China and Japan, but has been introduced into America and Australia. In China it is preserved with sugar in jars, and forms an important export.

Kúnch (könch), a town of India, in Jaláun district, N. W. Province. Pop. 13,139.

Kunduz (kön-döz'), a portion of Northeastern Afghanistan, between the Amu Daria and the Hindu Kush.

Kunersdorf (kö'nerz-dorf), a village in Prussia, in the province of Brandenburg, near Frankfurt-on-the-Oder, celebrated for the defeat of Frederick the Great by the combined Russian and Austrian forces in August, 1759.

Kungur (kön-zör'), a town of Russia, in government of Perm. Pop. 14,324.

Kunigundé (kö-ne-zön'de), SAINT, daughter of Siegfried of Luxembourg, married Henry of Bavaria, afterwards Henry II of Germany; died as a nun in 1031. Accused of adultery, she is said to have vindicated herself by walking over red-hot plowshares barefooted. She was canonized in 1200, her feast being March 3.

Kur, or KURA (kö'ra; ancient *Cyrus* or *Kûros*), a river of Western Asia, rises in the mountains W. of Kara, flows through the Russian governments of Tiflis, Elizabethpol and Baku, and falls into the Caspian Sea, after a course of between 500 and 600 miles. It has numerous tributaries, the principal of which is the Aras or Araxes.

Kurdistan (kụr-di-stän'; 'Land of the Kurds'), an extensive territory of Western Asia. As it does not form a separate political division, its exact limits are not ascertained; but the eastern part of it forms the Persian provinces of Ardilan and Kermanshah, and the remainder, constituting the far larger portion, is in Turkey, where it forms the principal part of the pashalic of Van and a considerable part of that of Bagdad. It is a mountainous region, containing considerable forests of oak and other hard timber, and also numerous pastures, on which horned cattle, sheep and fine-haired goats are reared, and in the valleys many fertile districts yielding rice, cotton, flax, fruits and gallnuts. It is drained by the Tigris and the Euphrates and their tributaries. The Kurds, to whom the territory owes its name, are not confined within its limits, but are found in considerable numbers eastward in Khorasan and over the hilly region of Mesopotamia, as far west as Aleppo and the Taurus. They are a stout, dark race, well formed, with dark hair, small eyes, wide mouth and a fierce look. On their own mountains they live as shepherds, cultivators of the soil, and bandits. Their language is a dialect of Persian, now much mixed with Arabic and Syriac; their religion Sunnite Mohammedanism. The Kurds owe but slight allegiance to either Turkey or Persia, living in tribes under their own chiefs, who commonly exact duties on the merchandise which passes over their territory. Their numbers have been estimated at 1,800,000.

Kuriles (kö′rilz), a chain of islands in the North Pacific, extending southwest to northeast, from Japan to Kamchatka, and belonging to Japan; area, about 5000 sq. miles. The whole chain is of volcanic origin, and there are many active volcanoes, one of which is from 12,000 to 15,000 feet high.

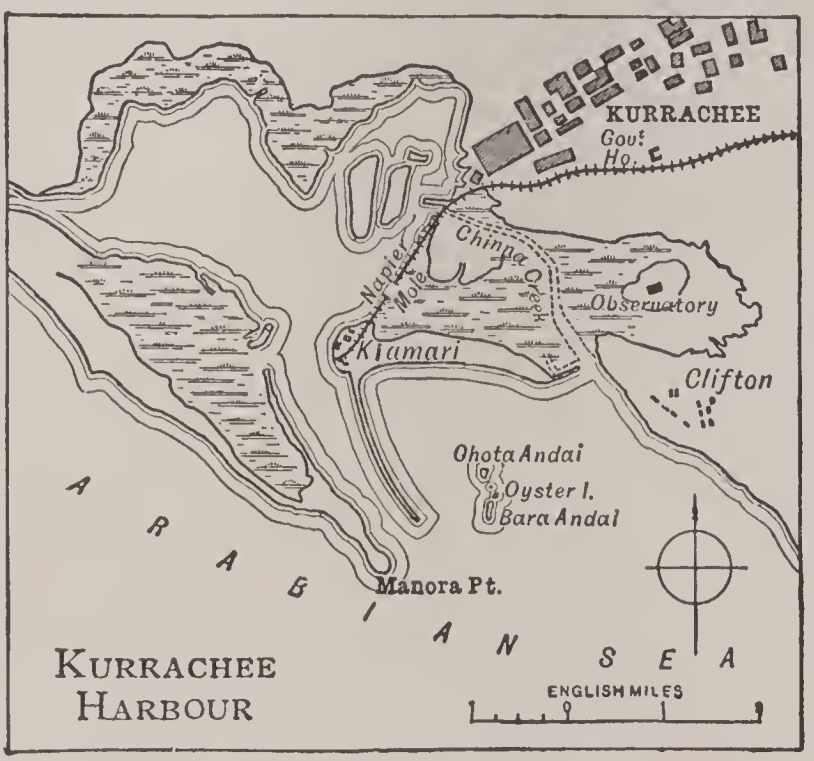
Kurnal, KURNUL. See *Karnul.*

Kuroki (kö-rō′ki), TAMESEDA, a Japanese general, born in Kogoshima in 1844. He took an active part in the revolution in favor of the mikado, rose to the rank of general in 1894, and captured Weihaiwei from China in 1895. In the war of 1904-05 he made brilliant operations against the Russians at the Yalu, Liaoyang and Mukden.

Kuropatkin (kö-ro-pat′kin), ALEXEI NICHOLAVITCH, a Russian general, born in 1848. After a long service in Asia and Turkey, he was made commander-in-chief of the Russian army in 1897 and minister of war in 1898. He commanded in Manchuria in the war with Japan, but was dismissed from his command in March, 1905, as a result of the Russian disasters, for which, however, he was not responsible. He patriotically accepted a subordinate command under his successor.

Kuro Siwo, or JAPAN CURRENT, the Gulf Stream of the Pacific, is the offspring of the great equatorial current, flows past Formosa, Japan, the Kuriles, the Aleutian Islands, and thence bends southwards to California. It is much inferior to the Gulf Stream both in volume and high temperature.

Kurrachee (ka-rä′chē), or KARACHI, an important seaport of India, on the coast of Sind, Bombay Presidency, at the northern (or western) angle of the Indus delta, situated on a large and commodious creek or inlet, forming a good haven, perfectly safe in all winds, and out of the track of cyclones. The harbor is formed by a long narrow strip of sand on the west, ending with a rocky promontory called Manora Head, on which is a lighthouse; and by the Island of Kiamari on the east. The town, which is well built and has a good reputation for healthiness, came into British possession in 1842, and its extensive commerce, fine harbor works, and numerous flourishing institutions have all sprung up since that time. Pop. 116,663.



KURRACHEE HARBOUR

Kursk (kụrsk), a government of Southern Russia, area 18,901 square miles. The surface is undulating, and there are numerous streams, but none of them serviceable as waterways. The climate is mild and dry, and the rich soil produces abundant crops. Pop. 2,391,091 —KURSK, the chief town, on the Tuskora near its junction with the Sem, forms a railway junction from Moscow, Kieff, and Khartoff. The principal public buildings are the Cathedral of the Resurrection, the Cathedral of St. Sergius, and a monastery. Pop. 52,896.

Kusi. See *Coosy.*

Kusnezk (kös-nyesk′), a town in Russia, government of Saratov. Pop. 17,932.

Küstendji (kûs-tend′ji), a Roumanian seaport of the Dobrudja, on the Black Sea, 140 miles E. of Bukarest. It is the chief outlet for the produce of the Dobrudja. Pop. about 3000.

Küstenland (kû s′ten-lânt; 'Coastland'), an administrative division of the Austrian Empire, at the head of the Adriatic, consisting of the county of Görz and Gradiska and the margraviate of Istria, with the town of Trieste; area, 3084 square miles. The majority of the inhabitants are of Slavonic origin, but there is also a large proportion of Italians and a considerable number of Germans. Pop. 755,183.

Küstrin (kûs′trin), or CÜSTRIN, a fortified town in Prussia, in the province of Brandenburg, 16 miles north of Frankfurt-on-the-Oder, at the

junction of the Wartha with the Oder. It contains a castle in which Frederick the Great was confined by his father, and has manufactures of woolens, machinery, brass and copper wares, etc. Pop. 16,643.

Kutais (kụ-tä′is), a Russian town, in Transcaucasia, capital of a government of the same name, 60 miles east from the Black Sea, on the railway between Poti and Tiflis. Pop. 32,492. The government has an area of 14,100 square miles, and pop. of 933,773.

Kutaya, or KUTA′IAH (kö-tā′yȧ), a town in Asiatic Turkey, 180 miles northeast of Smyrna, on the route between Constantinople and Konia. It is the center of the tract where the famous Turkey carpets are manufactured. Estimated pop. 25,000.

Kutch. See *Cutch.*

Kuttenberg (köt′en-bėrg), a mining and manufacturing town of Bohemia, 38 miles E. S. E. of Prague. Pop. 14,799.

Kutusoff (kö-tö′sof), MIKHAIL, a Russian field-marshal, born in 1745; died in 1813. He served against the Poles and the Turks, and became lieutenant-general in 1789. He was successively ambassador at Constantinople and Berlin, and in 1805 took command of the first corps of the Russian army against the French. He defeated Marshal Mortier at Dürenstein, and commanded under the Emperor Alexander at Austerlitz. In 1812 he superseded Barclay de Tolly in the war against Napoleon shortly before the battle of Borodino. For his victories over Ney and Davoust near Smolensk, he received the title of Prince Smolensky.

Kuvera (kö-vē′ra), in Hindu mythology, the god of wealth. He resides in the splendid palace of Alaka, on Mount Meru, and is borne through the sky by four attendants on a radiant car given to him by Brahma. He has no temples dedicated to him, and no altars. On his head is a richly ornamented crown, and two of his four hands hold closed flowers of the lotus.

Kuyp (koip), or CUYP, ALBERT, Dutch painter, born at Dort in 1605; died in 1691. He studied under his father, Jacob Gerritsz Kuyp, a painter of some fame. He painted with great success landscapes, cattle, river scenes, portraits and pictures of still life. He particularly excelled in the purity and brilliancy of light; and he was not surpassed, even by Claude, in accurate representation of the atmosphere, and of the effects of sunshine. The best of his pictures are his landscapes, with meadows, herds and horsemen, and often with boats and barges.

Kwango, or KUANGO (kwängö), a great river of Central South Africa, belonging to the Congo system, flowing almost due north, and joining the Kassai.

Kwangsi (kwäng′sē′), a province of China, lying between lat. 22° and 26° N., and lon. 105° and 112° 30′ E. It is mountainous, and is watered by the numerous branches of the Tao or Sikiang. Rice is largely grown, and gold, silver and mercury are mined. Area, 78,250 square miles; pop. about 5,000,000.

Kwang-seu, a Chinese emperor, born in 1871. He was chosen to succeed the Emperor Tung-Che in 1875, being the infant grandson of the Emperor Taoo Kwang, who died in 1850. His aunt, Tsze Hsi, the empress dowager, who had long been practically empress, continued to rule as regent during his minority. After he came of age he, under the influence of reformers, set in train a series of radical changes in the government. To prevent this the empress, supported by the conservative party, seized the reins of power, holding him under strict palace surveillance. In later years, however, she consented, under the pressure of events, to still greater reforms than those proposed by him. He died in November, 1908, and was succeeded by another infant emperor, Pu Yi. The empress dowager died the day after him.

Kwangtung (kwang′töng′), the most southerly province of China, bordering on the Gulf of Tonquin and the China Sea. The northern part is mountainous, but the southern region is about the most fertile in China. It includes Hainan and a number of smaller islands along the coast. The capital is Canton; other ports are Swatow and Pakhoi. Area, 79,456 square miles; pop. about 30,000,000.

Kweichow (kwī′chou′), a province of S. W. China, bounded by Sechuen, Yunnan, Hunan and Kwangsi. It is rough and mountainous, produces rice, tobacco and timber, and has mines of copper, iron, lead and mercury. Area, 64,554 square miles; pop. above 8,000,000.

Kyanite. See *Cyanite.*

Kyanizing (kī′an-īz-ing), a process for preserving timber, cordage, etc., from the effects of dry-rot, named from the inventor, a Mr. Kyan. It consists in immersing the material to be preserved in a solution of corrosive sublimate. This process is now almost entirely disused, as wood is much better

preserved by being saturated with creasote or coal-tar.

Kyd (kid), THOMAS, an English dramatist, who flourished about 1580, a shore time before Shakespere. His extant works are *Cornelia, or Pompey the Great his fair Cornelia's Tragedy; The First Part of Geronimo;* and *The Spanish Tragedy.* The last named displays much power and is thought to have suggested to Shakespere some parts of *Hamlet.*

Kyffhäuser (kif'hoi-zer), an ancient palace (now in ruins), of the emperors of the Hohenstaufen dynasty, on an eminence near the village of Tillida, Germany. There is a popular tradition that the Emperor Frederick Barbarossa still exists at this place in a magnificent subterranean palace, in a state of enchantment, seated with his knights around a stone table, through which his beard has grown. Every hundred years he partly wakes and sends someone to inquire how the time is going. After a certain time he will awake and bring better times to his empire.

Kyle (kīl), the middle district of Ayrshire, Scotland.

Kyoto (ki-ō'tō), or MIAKO, for over a thousand years the capital of Japan, is on a plain about 26 miles inland from Ozaka. Here remain the plain wooden buildings in which the emperors of Japan dwelt for so long in seclusion, retaining only their spiritual supremacy. It is an active industrial city, its porcelain, brocades, enamels, bronzes and embroideries being highly esteemed. Pop. (1903) 380,568.

Kyrie Eleison (kī'ri-ē ā-lī-son; from the Greek *Kyrie eleēson*, 'Lord, have mercy'), a kind of invocation used in parts of the Roman Church service, and the name given to the responses after the commandments in the Anglican Church. It is almost the only part of the liturgy in which the Roman Catholic Church has retained Greek words.

Kyrle (kėrl), JOHN, surnamed by Pope the *Man of Ross*, was born in Gloucestershire in 1637; died at Ross, Hereford, in 1724. He was distinguished by his active benevolence and also for enlisting the sympathies of his wealthy neighbors in his plans for making life more pleasant to his townsfolk.

L

L, the twelfth letter of the English alphabet, is usually denominated a semivowel or a liquid. *L* has only one sound in English. The nearest ally of *l* is *r*, the pronunciation of which differs from that of *l* only in being accompanied by a vibration of the tip of the tongue. There is no letter, accordingly, with which *l* is more frequently interchanged, instances of the change of *l* into *r* and of *r* into *l* being both very common in various languages. In fact, in the history of the Indo-European alphabet *l* is considered to be a later modification of *r*.

La, in music, the sixth of the seven syllables—*ut* or *do*, *re*, *mi*, *fa*, *sol*, *la*, *si* (or *ti*)—representing the seven sounds in the diatonic scale.

Laager (lä'gėr; D. 'a camp'), in South Africa, an encampment more or less fortified. The original Boer laager is an enclosure made of the wagons of a traveling party for defense against enemies.

Laaland (lol'lån), or LOLLAND, an island in Denmark, S. of Seeland, and separated from Falster on the E. by the narrow Guldborgsund; greatest length, S. E. to N. W., 36 miles; breadth, varying from 9 miles to 17 miles; area, 462 square miles. The surface is low and level; the soil very fertile, yielding crops of corn, beans, hops, hemp and excellent timber. Pop. 70,596.

Laar, or LAER (lär), PIETER VAN, surnamed *Il Bamboceio*, a Dutch painter, born in 1613; died at Haarlem in 1674 or 1675. He made a long residence at Rome, returning to Holland about 1639. He painted generally lively scenes from peasant life, fairs, children's games, hunting scenes, landscapes, etc.

Labarum (l a b'a-r u m), the imperial standard adopted by Constantine the Great after his miraculous vision of the cross and conversion to Christianity, differently described and figured, but generally represented as a pole having a crossbar with the banner depending from it and bearing the Greek letters XP (that is, *Chr*), conjoined so as to form a monogram of the name of Christ.

Labat (lå-bä), JEAN BAPTISTE, a French missionary and traveler, born in 1663; died in 1738. He spent about twelve years in the West Indies, and is best known by his *Nouveau Voyage aux Iles de l'Amérique*. He also published a *Nouvelle Relation de l'Afrique Occidentale; Voyage en Espagne et Italie; Relation Historique de l'Ethiopie Occidentale*, and *Mémoires du Chevalier d'Arvieu*.

Labédoyère (l å - b ā - d w å - y ā r), CHARLES ANGÉLIQUE HUCHET, COMTE DE, French general, was born in 1786; shot in 1815. He entered the army in his 20th year, served with much distinction in Spain, Germany, etc., and was several times severely wounded. Napoleon raised him to the rank of general of division in 1815, and he fought with great courage at Waterloo. After the battle he hurried to Paris, and there distinguished himself by his hostility to the Bourbons. On the capitulation of Paris he followed the army behind the Loire, but returning to Paris, he was taken, tried by court-martial, and sentenced to death.

Label (lā'bel), in Gothic architecture, a projecting tablet or molding over doors, windows, etc., called a hood-molding, and a drip, dripstone, or weather-molding when it is turned square.

Labials (lā'bi-alz), letters or characters representing a sound or articulation formed or uttered chiefly by the lips, as *b*, *f*, *m*, *p*, *v*.

Labiatæ (la-bi-a'tē), the mint tribe, a very important and extensive natural order of exogenous plants, with a gamopetalous corolla presenting a prominent upper and lower lip, and a four-lobed ovary, changing to four seed-like monospermous fruits. This order contains about 2600 species, mostly herbs, undershrubs, or shrubs with opposite or whorled leaves, usually square stems, and a thyrsoid or whorled inflorescence. They are spread throughout the world, and abound in all temperate latitudes. Many are valued for their fragrance, as lavender and thyme: others for their stimulating qualities, as mint

and peppermint; others as aromatics, as savory, basil and marjoram; several are used as febrifuges. Betony, ground ivy, horehound and others possess bitter tonic qualities. Numerous species are objects of great beauty.

Labiche (lȧ-bēsh), EUGÈNE MARIN, a French dramatist, born in Paris in 1815. He, chiefly in collaboration with other authors, brought out upwards of 100 plays, many of them very successful. They are mostly distinguished by extravagant plots, and are full of droll situations. In 1880 he was elected to the Academy. Died in 1888.

Labium (lā'bi-um; L. 'a lip'), in zoology, a term applied to the lower lip of the insects and other Arthropoda, the upper being called the *labrum*. The term is also applied to the inner lip of the shell of univalve molluscs, the outer lip being the *labrum*.

Lablache (lȧ-blȧsh), LUGI, celebrated basso singer, born in Naples in 1794; died there in 1858. He was educated in a musical conservatory at Naples; went early on the stage, and in 1817 obtained great success as *Dandini* in Rossini's *Cenerentola*. He first visited Britain in 1834, and became very popular. His best character was *Bartolo* in *Il Barbiere*. In physique he was a perfect colossus, with the head, as has been remarked, of a Jupiter, the figure of a Milo, and the voice of a Boanerges. His voice was unsurpassed for magnificent sonorousness, flexibility and compass, and his dramatic were no less conspicuous than his vocal talents.

Labor. See *Birth*.

Labor (lā'bur), exertion, physical or mental or both, undergone in the performance of some task or work; particularly the exertion of the body in occupations by which subsistence is obtained, as in agriculture and manufactures.

Labor Day, the first Monday in September, is set apart to be celebrated by the organizations of labor in the United States. It originated in 1882, and is now a legal holiday in all the States.

Labor Organizations. The various countries of the world have been very active within recent years in the organization of workingmen, alike in minor combinations of trades and general organizations, embracing nearly all the artisans of a country. Some of these, indeed, have expanded to international dimensions. In the United States, for instance, in addition to the very numerous trades unions, there are several great organizations including many of these minor bodies. The oldest of these is the *Knights of Labor*, organized in Philadelphia in December, 1869, it originating in the Garment Cutters' Union of that city. It grew rapidly in numbers until in 1886, under the leadership of T. V. Powderly, its membership was over 500,000. It spread into Canada, Great Britain and Belgium, but since then its membership has much decreased, through the activity of other organizations. Of these may be mentioned the *American Federation of Labor*, originated in 1881, and nationally organized at Columbus, Ohio, in 1886; the *American Railway Union*, formed in 1893; the *Independent Knights of Labor*, dating from 1895, and the *Trades Union Alliance*, of 1896. Since these dates changes have taken place in these bodies and various other national unions have been organized. Of these associations the *American Federation of Labor* has made much the greatest progress and is far the most powerful of American labor combinations. Its principal objects are to promote the interests and influences of trades unions, to aid in creating new unions, and to advance the general cause of organized labor. It does not undertake, however, to exercise any absolute authority over affiliated societies, as is done by the Knights of Labor. It has been especially active in agitating for 'eight hour' legislation and in combating what it considers the unjust use of the principle of injunction. It has also striven to extend the use of the union label by its affiliated bodies, also of the union button and store cards. It has been under the able presidency of Samuel Gompers, with an intermission of one year, since its organization, and now embraces 120 national and international unions, representing approximately 27,000 local unions, and has a paid membership of about 2,000,000. One result of the activity of organized labor has been legislation of an important character, including enactments providing for the insurance of workmen against accident and making employers responsible for accidents due to negligence on their part or that of their agents; also for the regulation of woman and child labor. Labor organizations in Great Britain have long been prominent, their strength being first fully enumerated in the victory for the ten-hour movement in 1847. In the same year the first labor member of Parliament, Thomas Burt, was elected. Since then these organizations have grown until they have a membership rivaling that of the American Federation. Germany, France, and some other European countries have similar organizations, but they

are weak in membership as compared with the United States and Britain.

Laboratory (lab'or-a-to-ri), a building or workshop designed for investigation and experiment in chemistry, physics, etc. It may be for special research and analyses or for quite general work. To the former class belong the laboratories which are attached to dye-works, color works, chemical and similar works. Laboratories are also attached to mining and metallurgical schools, to mints, to arsenals, etc. A general laboratory, such as might be attached to a school or university, has to include a variety of specialties, partly because the whole science and its applications have to be taken into account and exhibited, partly because students with very different aims frequent such places.

Labouchère (lab'ų-shār), HENRY, an English politician and writer, was born in 1831, and educated at Eton. He was in the diplomatic service from 1854 to 1864; became a member of Parliament in the Radical interest for Windsor (1865-66), Middlesex (1867-68), and Northampton after 1880. He has gained a certain renown for his vivacious and satirical style, both in speaking and writing. He contributed *Letters of a Besieged President in Paris* to the *Daily News*—of which he was part proprietor—during the Franco-German war. In 1877 he started *Truth*, a weekly society paper.

Laboulaye (lå-bö-lā), EDOUARD RENÉ LEFEBVRE, a French publicist, born in 1811; died in 1883. He attained a high position as a writer of historical, social and playfully satirical works. Among his best-known writings are *History of Landed Property in Europe; History of the United States; Germany and the Slavic States; Paris in America; The New Bluebeard; The Poodle Prince; Prince Caniche*, etc., etc.

Labrador (lab'ra-dōr), a country on the east coast of North America, between Canada and the Atlantic Ocean. The interior consists mostly of a tableland 2000 or more feet high. There are a number of lakes drained partly by rivers flowing towards Hudson Strait, partly by others (such as Grand River) reaching the Atlantic in the southeast. The wild animals include the caribou or reindeer, bears, wolves, foxes, martens, and other fur-bearing animals. The climate is rigorous, there being about nine months of winter. No ordinary cereal can ripen in the climate, though barley cut green is used as fodder, and potatoes and some culinary vegetables can be grown. The population (not over 15,000) consists of Indians, Eskimos and half-breeds, with a few whites on the coast. In summer it is increased by some 30,000 persons, chiefly from Newfoundland and connected with the fisheries. The Moravians have a number of missions along the coast, the Church of England one or two. The Hudson Bay Company has several posts. Labrador is also the name given to the whole peninsula between the Atlantic, Hudson Strait and Hudson Bay and the St. Lawrence. See *Canada, Northeast Territory, Quebec.*

Labradorite (lab'ra-dōr-īt), LABRADOR FELSPAR, a mineral found on the coast of Labrador, and formerly called *Labrador hornblende*, though that is the designation of hypersthene. It is a lime-soda felspar, and is distinguished by its splendent changeability of color. Blue and green are the most common colors, but occasionally these are intermingled with rich flame-colored tints. It is sawed into slabs by the lapidaries, and employed in inlaid work.

Labrador Pine. Same as *Banksian Pine.*

Labrador Tea, a name given to two species of the genus *Ledum* (*L. latifolium* and *L. palustre*). They grow in the north of Europe, and in America north of Pennsylvania. They are species of heath, and are low shrubs with alternate entire leaves clothed underneath with rusty wool. The fragrant crushed leaves are used by the natives of Labrador as a substitute for tea. They possess narcotic properties, render beer heady, and are used in Russia in the manufacture of leather.

Labret (la'bret), an ornament worn in a hole in the lip by certain tribes of savages. This custom is found among various Indian tribes and through parts of Central Africa, in some instances only by women, in others, as the Eskimos of Alaska, by men as well. Labrets may be oval pieces of wood, bone or ivory two inches wide, or may take other shapes. In Central Africa the labrets worn by women are so large and the lower lip so distended as at times to hide the whole face when lifted.

Labridæ (lab'ri-dē), the wrasse tribe, a family of acanthopterygious fishes, having the genus *Labrus* as the type. The ventral fins are under the pectorals, and the scales are cycloid.

Labrum. See *Labium.*

Labruyère, JEAN DE. See *Bruyère.*

Labuan (lä-bö-än'), a small British colony consisting of an

island on the N. W. of Borneo. Area, 31 square miles; pop. 6298, mostly Malays from Borneo. It is well supplied with water, and has a good harbor at the settlement of Victoria, on its southeast side. Coal of excellent quality is plentiful, but has been mined hitherto with indifferent success. Other products are timber, caoutchouc, gutta-percha, wax and sago. Its chief trade is between Borneo and Singapore. This island was taken possession of by the British in 1846, and is administered by a governor and a legislative council.

Laburnum (la-bur'nam), a tree of the genus *Cytĭsus*, the *C. Laburnum*, nat. order Leguminosæ, a native of the Alps, much cultivated by way of ornament. It is well and widely known for the beauty of its pendulous racemes of yellow, pea-shaped flowers. The seeds contain a poisonous substance called cytisine, and are violently emetic. The wood is much prized by cabinet-makers and turners, being wrought into a variety of articles which require strength and smoothness.

Labyrinth (lab'i-rinth), a structure having numerous intricate winding passages, which render it difficult to find the way through it. The legendary labyrinth of Crete, out of which no one could find his way, but became the prey of the Minotaur, was said to have been constructed by Dædalus. The hint of this legend was probably given by the fact that the rocks of Crete are full of winding caves. The Egyptian labyrinth was a building situated in Central Egypt, above Lake Moeris, not far from Crocodilopolis (Arsinoe), in the district now called the Fayoum. The building, half above and half below the ground, contained 3000 rooms. It was probably a place of burial. The labyrinth at Clusium, in Italy, was erected by the Etruscans, according to Varro, for the sepulcher of King Porsenna. There were other labyrinths at Lemnos and Samos, but their sites are unknown. Imitations of labyrinths, called mazes, were once fashionable in gardening. They were made of hedges of privet, or some similar shrub. The best known is that of Hampton Court.

Labyrinthodon (lab-i-rinth'o-don), a genus of fossil amphibians, whose remains are found in the carboniferous, permian and trias formations, those of the trias being found in England, India and Africa. They were allied to the crocodile and to the frog, and were 10 to 12 feet long. The name is derived from the labyrinthine structure of a section of the tooth, when seen under the microscope. The hypothetical cheirotherium has been identified with the Labyrinthodon.

Labyrinthodon Salamandroides (restored). —Owen.

Lac, or LAX, from the Sanskrit *lakshâ* or *laksha*, that is, 100,000. In the East Indies it is applied to the computation of money. Thus, a lac of rupees is 100,000.

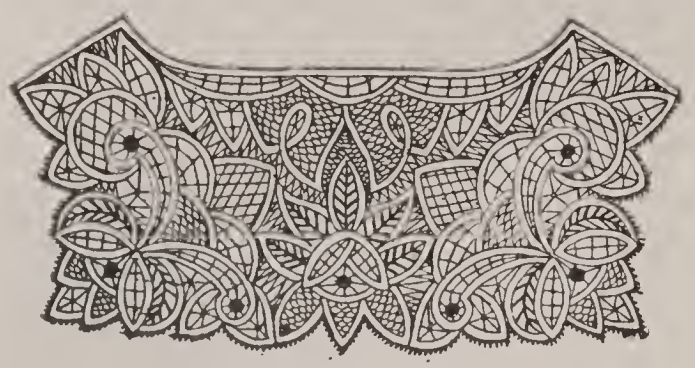
Lac, a resinous substance produced upon numerous Indian trees by the exudations from the body of the female of the *Coccus ficus* or *Coccus lacca*. The finest is found on the palas or dhak (*Butča frondōsa*), the peepul (*Ficus religiōsa*), and the koosum (*Schleichĕra trijŭga*). It is composed of five different varieties of resin, with a small quantity of several other substances, particularly a red coloring matter. It is formed chiefly by the female insects, each of which inhabits a cell, the encrustation of which seems intended to serve as a protection for the young. When the covering is complete the eggs are laid and the mother dies. The young break their way out, swarm on to the bark, and immediately commence the secreting of lac. In India the cultivation of the lac insect has received much attention. *Stick-lac* is the substance in its natural state, encrusting small twigs. When broken off and washed with water it almost entirely loses its red color, and is called *sced-lac*, from its granular form. When melted and reduced to a thin crust, it is called *shell-lac*. Mixed with turpentine, coloring matters, and other substances, lac is used to make differently colored sealing wax. Dissolved in alcohol or other menstrua, by different methods of preparation, it constitutes various kinds of varnishes and lacquers.—*Lac-dye* and *lac-lake* are coloring matters used in dyeing cloth scarlet, obtained by different processes from stick-lac. In the state in which they are found in commerce they have the form of little cakes. They were formerly obtained only from the East, but a superior kind of lac-dye is now manufactured in England from

stick-lac. The coloring matter of lac-dye is analogous to cochineal.

Lacaille (lå-kā-yė), Nicholas Louis de, a French mathematician and astronomer, was born in 1713; and died in 1762. He was educated for the church, but soon renounced theology for astronomy. He took an important part in the work of measuring an arc of the meridian, and in 1746 he was appointed professor of mathematics in Mazarin College. In 1751 he went to the Cape of Good Hope at the expense of the government, where he determined the position of about 10,000 stars with wonderful accuracy. As his departure from the Cape was delayed he employed the interval in measuring a degree of the southern hemisphere. His works on geometry, mechanics, astronomy and optics were numerous. Among them are *Leçons d'Astronomie* and *Astronomiæ Fundamenta.* His *Cœlum Australe Stelliferum* and *Journal Historique du Voyage fait au Cap de Bonne Espérance* were published after his death.

Laccadive Isles (la'ka-dīv), a group of fourteen small coral islands including three reefs in the Indian Ocean, about 150 miles off the coast of Malabar, belonging to British India. The islands are well supplied with fish, and export quantities of coir or cocoanut fiber. Cocoanuts, cowries, jaggery, plantains, poultry, etc., are the only other exports, and are of little importance. The natives are a race of Mohammedans called Moplas (of mixed Hindu and Arab descent). They are bold seamen and expert boat-builders. Pop. 10,274.

Lace (lās), a delicate kind of network, formed of silk, flax, or cotton thread, and used for the ornamenting of women's dresses. It is made either by hand or machine, the former being produced by the needle, or made on the pillow. Needle laces are called *point*, those made on the pillow, *cushion*, *bobbin*, or *bone* laces. A prominent feature in all laces is the pattern or ornament; this may be worked either with or without a groundwork. Pillow lace consists of hexagonal meshes, four of the sides of each mesh being formed by twisting two threads round each other, and the other two sides by the simple crossing of two threads over each other. The pattern on parchment or vellum is attached to the pillow, and pins are stuck in the lines of the pattern, round which the threads are plaited and twisted so as to form the required design. Among the laces of this class are Honiton, Buckingham, Mechlin. Valenciennes, etc. Point laces, made entirely by the needle and single thread, are known as Brussels, Alençon, Maltese, etc. Guipure lace consists of a network ground on which patterns are wrought in various stitches with silk, etc. It was



Battenberg Lace.

originally a lace made in silk, thread, etc., on little strips of parchment or vellum. At Nottingham and elsewhere imitations of lace are produced by machines, called point net and warp net, from the names of the machines in which they are made. They are both a species of chain work, and the machines are varieties of the stocking-frame. The manufacture of lace appears to have existed from a considerably remote antiquity, as in the representations of Grecian female costume which have come down to us the dresses are frequently ornamented with lace of beautiful patterns. In modern times point lace originated in Italy, from which the manufacture spread to Spain and Flanders. Pillow lace was first made in the Low Countries. See *Battenberg.*

Lace-bark Tree (*Lagetta lintearia*), a tree of the natural order Thymelaceæ or Daphne family, is a native of the West Indies. It receives its common name from the fact that when its inner bark is cut into thin pieces, after maceration it assumes a beautiful net-like appearance. It is used by females by way of ornament, and the negroes manufacture matting from it.

Lacedæmon (la-se-dē'mun). See *Sparta.*

Lace-leaf. See *Lattice-leaf.*

Lacépède (lå-sā-pād), Bernard Germain Etienne de la Ville-sur-Illon, Count de, a French naturalist, born in 1756; died in 1825. He abandoned the military profession, for which he was educated, and devoted himself to the study of natural history. His teachers and friends, Buffon and Daubenton, procured him the important situation of keeper of the collections belonging to the department of natural history in the Jardin des Plantes. In 1791 he was

elected member of the legislative assembly, and belonged to the moderate party. During the reign of terror he found refuge in the country. Napoleon made Lacépède a member of the conservative senate, and conferred on him the dignity of grand-chancellor of the Legion of Honor. After the restoration he was made a peer of France. In 1817 he published a new edition of Buffon's works. His *History of Fishes* is considered his principal work. He published likewise the *Natural History of Oviparous Quadrupeds and of Reptiles.*

Lacerta, LACERTIDÆ. See *Lizard.*

Lace-winged Flies, insects of the genus *Hemerobius*, order Neuroptera, so called from their delicate wings having many netted spaces like lace. The larvæ are exceedingly voracious, and feed upon aphides.

Lachaise (lå-shāz), FRANÇOIS D'AIX DE, confessor of Louis XIV, member of the congregation of Jesuits, was born in the Château d'Aix in 1624; died in 1709. Lachaise commenced his course of studies in the Jesuit College at Rohan, and finished it at Lyons. He was the provincial of his order when Louis, on the death of his former confessor, Father Ferrier, appointed Lachaise his successor in 1675. He had much influence with the king, and, acting with prudence and moderation, he kept the post till his death. He left philosophical, theological and archæological works. Louis XIV had a country house built for him to the west of Paris, the extensive garden of which now forms the cemetery of Père Lachaise, the largest in Paris.

Lachesis (lak'e-sis), the name of one of the three Fates in classical mythology whose duty it was to spin the thread of life.

Lachine (lå-shēn), a village of Canada, province of Quebec, on Montreal Island. There are here rapids on the St. Lawrence which are avoided by means of a canal 9 miles long from Montreal harbor. Pop. (1911) 10,699.

Lachlan (lok'lan), a river of Eastern Australia, rising in New South Wales, to the west of the Blue Mountains. It is joined by the Murrumbidgee, the united stream afterwards falling into the Murray. It has a total length of about 700 miles.

Lachmann (lå*h*'mån), KARL, a German critic and philologist, born at Brunswick in 1793; died at Berlin in 1851. He studied at Leipzig and Göttingen, and became a professor at Königsberg in 1818, and afterwards at Berlin in 1827. His critical sagacity was very great, and he published valuable editions of the Latin and old German classics.

Lachrymæ Christi (l a k' r i - m ē k r i s' t ī; literally 'tears of Christ'), a sweet but piquant muscatel wine of agreeable flavor produced from grapes grown on Mount Somma, the second summit of Vesuvius. There are two kinds, the white and the red, of which the former is generally preferred.

Lachrymal Organs. See *Eye.*

Lachrymatory (l a k' r i-ma-to-ri), a s m a l l glass vessel found in ancient sepulchers, in which it has been supposed the tears of a deceased person's friends were collected and preserved with the ashes and urn.

Lackawanna, a city in Erie County, New York. Dating since 1900, it had in 1910 a pop. of 14,549.

La Condamine (lå koṇ-då-mēn), CHARLES MARIE, was born at Paris in 1701, and died at the same place in 1774. He entered the military profession, but soon renounced this career, and devoted himself to the sciences. In 1736 he was chosen, with Godin and Bouguer, to determine the figure of the earth, by measurements to be made in the equatorial regions of South America, and he remained abroad for eight years. In 1748 he was elected a fellow of the Royal Society of London, and in 1760 a member of the Academy of Sciences of Paris. His principal works are his account of his travels, his work on the figure of the earth, etc.

Laconia (la-kō'ni-a), a city, capital of Belknap County, New Hampshire, 27 miles N. by E. of Concord. It has extensive manufactures of hosiery, yarn, railroad cars, woolen goods, etc. Pop. 10,183.

Lacordaire (lå-kor-dār), JEAN BAPTISTE HENRI DOMINIQUE, a French pulpit orator, born in 1802; died in 1861. He was educated for the law, which he renounced for the church, and received holy orders in 1827. In 1830 he was associated with Lamennais and Montalembert in conducting *L'Avenir*, in which the highest church principles and extreme radicalism were advocated with great eloquence and ability. Their paper was condemned by the pope in 1832, whereupon Lacordaire devoted himself to the duties of the pulpit, and the freedom and eloquence with which he treated social affairs in his discourses attracted admiring and spell-bound audiences. He became a Dominican friar in

1840, and his fame as an orator being now fully established, his advocacy of charities was eagerly sought, not only in Paris, but in the provinces. In the first election after the revolution of 1848 he was chosen the representative in the Constituent Assembly for the department of Bouches-du-Rhône, but resigned his seat after a few weeks. In 1850 the pope conferred on him the office of provincial of the Dominicans in France, which he held for four years. In 1860 he was elected into the Académie Française. His chief works are *Considerations on the Philosophic System of Lamennais, Sermons at Nôtre Dame, Letter on the Holy See, Letters on the Christian Life,* etc.

Lacquer (lak'ėr), a varnish usually consisting of a solution of shell-lac (sometimes sandarach, mastic, etc.) in alcohol, colored by arnotto, gamboge, saffron, and other coloring matters, for coating brass and some other metals, to give them a golden color, to preserve their luster, and to secure them against rust. Lacquered brass appears as if gilt, and tin is made yellow. Lacquering is also applied to the coating with varnish of goods in wood and papier-mâché. The Japanese and Chinese excel in works of this kind.

La Crosse (lȧ-kros), a city, capital of county of same name, Wisconsin, on the Mississippi, near the mouth of La Crosse River, about 40 miles below Winona. It has a fine city hall, courthouse, opera houses, etc. Here are very extensive lumber mills, with an output of over 300,000,000 feet of sawed lumber annually; also large breweries and cooperages, foundries and machine shops, and other manufactures. It is an important shipping point for grain, lumber, etc. Pop. 30,417.

Lacrosse, a game at ball, originating with the Indians of Canada, played somewhat on the principle of football, except that the ball is carried on an implement called the *crosse*, the player in possession running with it towards the enemy's goal, and when on the point of being caught, passing it by tossing to one of his own side, or throwing it over his head as far in the direction of the goal as possible. Lacrosse clubs are now pretty numerous in Britain.

Lactantius (lak-tan'shi-us), LUCIUS CŒLIUS FRIMIANUS, or LUCIUS CÆCILIUS FIRMIANUS, a celebrated father of the Latin Church, probably a native of Italy, and born about the middle of the third century. He lived for a long time at Nicomedeia as a teacher of rhetoric, until Constantine the Great invited him to Gaul, and committed to his care the education of his eldest son Crispus. He died at Treves about 325. His writings are characterized by a clear and agreeable style. His seven

Crosse or Bat.

books, *Institutiones Divinæ*, are particularly celebrated, and worthy of notice.

Lacteals (lak'te-alz), numerous minute tubes which absorb or take up the chyle or milk-fluid from the alimentary canal, and convey it to the thoracic duct. See *Chyle, Lymph.*

Lactic Acid (lak'tik) ($C_3H_6O_3$), an acid found in several animal liquids, and particularly in human urine. It is not only formed in milk when it becomes sour, but also in the fermentation of several vegetable juices, and in the putrefaction of some animal matters. It is a colorless, inodorous, very sour liquid, of a syrupy consistence. It coagulates milk.

Lactine, LACTOSE (lak'tōs), sugar of milk ($C_{12}H_{22}O_{11}$), a substance obtained by evaporating whey, filtering through animal charcoal, and crystallizing. It forms hard, white, semitransparent trimetric crystals, which have a slightly sweet taste, and grate between the teeth. It is convertible like starch into glucose by boiling with very dilute sulphuric acid.

Lactometer (lak-tom'e-ter), or GALACTOMETER, an instrument for ascertaining the different qualities of milk. Several instruments of this sort have been invented. One consists of a glass tube 1 foot long, graduated into 100 parts. New milk is filled into it and allowed to stand until the cream has fully separated, when its relative quantity is shown by the number of parts in the 100 which it occupies.

Lactose. See *Lactine.*

Lactuca (lak-tū'ka), the lettuce genus of plants. See *Lettuce.*

Lactucarium (lak-tū-kā'ri-um), the inspissated milky juice of several species of lettuce. It possesses slight anodyne properties, and is sometimes used as a substitute for opium.

Lacustrine Villages (la-kus'trin), See *Lake Dwellings.*

Ladakh (lä-däk'), a governorship under the Maharajah of Cashmere, of irregular outline, comprising part of the valley of the Upper Indus and its tributaries. Lying at the back of the central Himalayas it has an elevation of from 9000 to 25,000 feet; area, about 30,000 square miles; capital, Le or Leh. The climate is characterized by cold and excessive aridity. Of domestic quadrupeds the principal are ponies, asses, oxen, sheep (regularly used as beasts of burden), goats and dogs. The wool of the goat is the well-known shawl-wool of Cashmere. There is a considerable transit trade, Ladakh being naturally the great thoroughfare between Chinese Tartary and Tibet, on the one hand, and the Punjab, on the other. The trade is supervised by two commissioners, one native and one British. The language is Tibetan, and the government a despotism controlled by the priesthood. The inhabitants are of Mongolian race and Buddhist religion. Polyandry prevails.

Ladanum (lad'a-num), a delicately scented, resinous gum which exudes from certain plants of the Cistus family growing in Crete, Cyprus and Asia Minor. In Cyprus the gum is collected from the beards of goats that browse among the bushes. It is also collected on fringes of leather attached to long poles and drawn over the bushes during the heat of the day. Ladanum was formerly used as a medicine and a perfume. It is now, in the form of small black balls, a costly toy fingered by soft-handed idlers in the Levant.

Lading, Bill of. See *Bill.*

Ladoga (lå-dō'gå), a lake in Russia.

Ladrones (la-drōnz', or la-drō'nes), or Marianne Islands, a group of sixteen islands in the North Pacific Ocean, east of the Philippines and the Caroline Islands. Guam is the southernmost and largest; next in importance is Rota. The islands are mostly of volcanic origin, and are very rugged, but their general aspect is picturesque, being densely wooded and covered with a perpetual verdure; the soil also is extremely fertile. The islands were discovered by Magelhaens in 1521, and were settled by the Spaniards. June 21, 1898, during the war with Spain, the United States cruiser *Charleston* took possession of Guam, hoisting the American flag over Fort Santa Cruz. A curious incident occurred in this capture. Several guns had been fired at the forts, when the Spanish governor approached the *Charleston* in a small boat and thanked the commander for the salute, thinking it was that of a friendly power. He added that he regretted he had no powder with which to return the compliment. The United States retains Guam. The other islands were sold by Spain to Germany in 1899.

Lady (lā'di), as a title, is borne in Britain by the wives of knights, and of all degrees above them, except the wives of bishops. The legal designation of the wife of a knight or baronet is *Dame*, though it is customary to designate her by *Lady* prefixed to her husband's surname. In the United States it is a term of general application. See *Address* (*Forms of*).

Lady-bird, the name of a number of small coleopterous insects, or beetles, common on trees and plants in gardens. They form the genus *Coccinella* of Linnæus. They are usually ornamented with scarlet spots. They are of great service to cultivators on account of their destruction of aphides or plant-lice.

Lady Chapel, a chapel dedicated to the Virgin Mary, frequently attached to large churches. It was variously placed, but generally to the eastward of the high altar, and in churches of earlier date than the thirteenth century the lady chapel is frequently an additional building. See under *Cathedral.*

Lady-day, the 25th of March, the day commemorating the Annunciation of the Virgin Mary, one of the regular quarter-days in England and Ireland. It is one of the immovable festivals of the Roman Catholic and Anglican churches.

Lady-fern, a species of polypodiaceous fern, the *Athyrium Filix-fœmina*, common in Great Britain. It has bipinnate or tripinnate fronds of delicate texture, and of a remarkably elegant plumy structure.

Lady's-slipper (*Cypripedium*), a beautiful genus of orchideous plants, conspicuous for its large inflated flowers. The species are confined to the northern regions of the globe. Three species are natives of the United States. *C. Arietinum*, found in the north, remarkable for the form of the lips, readily suggests the name.

Laennec (lå-en-nek), RENÉ THÉOPHILE HYACINTHE, a French physician, born at Quimper, in 1781; died in 1826. His fame rests on the splendid discovery of mediate auscultation; that is, of the use of the stethoscope. The original discovery, however, is claimed for Avenbrugger. In 1821 he was appointed professor of medicine in the College of France. The following year he was appointed professor of clinical medicine, and regularly performed the duties of his office till his death.

La Farge, JOHN, artist, was born in New York in 1835, studied architectural decoration and painting, began painting with religious subjects and decorative work, then became a flower and landscape painter, and during his later years occupied himself with the making of stained glass windows, inventing the new methods known as 'American' and completely changing the art of the glass stainer. Among his noted works are *Paradise at Newport, Christ and Nicodemus,* and the frescoes of Trinity Church, Boston. He died in 1910.

La Farina (lå få-rē'nå), GIUSEPPE, an Italian patriot, journalist and historical writer, born at Messina in 1815; died in 1863. He took part in the revolution of 1848, and subsequently coöperated with Cavour and Garibaldi. He wrote *Souvenirs of Rome and Tuscany,* the *Revolution of Sicily,* etc.

La Fayette (lå-få-yet), MARIE MAGDELAINE DE LA VERGNE, COUNTESS DE, a French novelist, born in 1632; died in 1693. In 1655 she married Count Francis de La Fayette, and her house became a place of meeting for the most distinguished men of her time, including Rochefoucauld, Huet, Ménage, Lafontaine, etc. The most distinguished of her novels are *Zaïde, La Princesse de Clèves* and *La Princesse de Montpensier.*

Lafayette, MARIE PAUL JEAN ROCH YVES GILBERT MOTIER, MARQUIS DE, was born in Auvergne in 1757; died in 1834. He commenced his career at the court of Louis XV, at the period when hostilities were commencing between Britain and her American colonies. In 1777 he left France for America, having fitted out a vessel for himself, and was received by Washington and his army with acclamations. He joined their ranks as a volunteer, was wounded near Philadelphia, and commanded the vanguard of the American army at the capture of Cornwallis. He returned to France on the close of the campaign; was called to the Assembly of the Notables in 1787, and was elected a member of the States-General, which took the name of *National Assembly* (1789). In the assembly he proposed a declaration of rights, and the decree providing for the responsibility of the officers of the crown. Two days after the attack on the Bastille he was appointed (July 15) commander-in-chief of the National Guards of Paris. It was through his means that the lives of the king and queen were saved from the mob

Marquis de Lafayette

that had taken possession of the palace at Versailles. After the adoption of the constitution of 1790 he resigned all command, and retired to his estate of La Grange. In 1792 he was appointed one of the three major-generals in the command of the French armies, and directed some small operations on the frontier of Flanders, at the same time striving unsuccessfully to defeat the Jacobins at Paris. Commissioners were sent to arrest him, on which he determined to leave the country, and take refuge in some neutral ground. Having been captured by an Austrian patrol, he was confined at Olmütz till 1797. After his return to his estate, he lived for many years without taking part in public affairs, and declining the dignity of senator offered him by Bonaparte, he gave his vote against the consulate for life. In 1818 he was chosen member of the Chamber of Deputies, and was a constant advocate of liberal measures. In 1824 he visited the United States, and was received with great enthusiasm. Congress voted him $200,000 and a township of land. During the revolution of July, 1830, he was appointed general of the National Guards of Paris, and it was chiefly to Lafayette that Louis Philippe owed his elevation to the throne.

Lafayette, a city, capital of Tippecanoe County, Indiana, on

the Wabash River and Wabash and Erie Canal, and at the intersection of several railways, 63 miles northwest of Indianapolis. It is the seat of Purdue University, the State agricultural college. It has important pork-packing industries, is a large market for grain, and has active manufactures. Pop. 20,081.

Lafayette a town, capital of Lafayette County, Louisiana, on the Vermilion River, 144 miles w. of New Orleans. It has cotton and cottonseed-oil industries and a sugar refinery. Pop. 6392.

Lafayette College, a flourishing institution at Easton, Pennsylvania, chartered in 1826. It has six degree courses of four years each—three general and scientific, and three technical. Its endowment amounts to about $800,000.

Laffitte (la-fēt), JACQUES, a French financier and statesman, born at Bayonne in 1767; died in 1844. He acquired a fortune by banking and was entrusted with the private property of both Napoleon and Louis XVIII. He took an active part in the revolution of July, 1830, was made minister of finance and president of the council, in which situation he remained until March 14, 1831. He lost his fortune in the crisis which followed, but a national subscription in 1833 relieved him from embarrassment.

Lafitte, JEAN, a French privateer, born about 1780, who about 1813 became the leader of a band of pirates established at Grande Terre, in Batavia Bay, on the coast of Louisiana, and plied his art in the Gulf of Mexico. In 1814, when the British fleet entered the Gulf for an attack on New Orleans, Lafitte was offered a large sum and a commission in the navy if he would aid in the attack. He refused and gave his aid to General Jackson in the defense, on condition of pardon to himself and followers. He subsequently reëngaged in piracy, but nothing is known of the time or cause of his death. His exploits have given rise to several tales and romances.

La Follette, ROBERT MARION, statesman, born at Primrose, Wisconsin, in 1855. He studied at the University of Wisconsin, was admitted to the bar in 1880, and was a Republican member of Congress from 1885 to 1891. He took a prominent part in framing the McKinley tariff bill. He was elected Governor of Wisconsin in 1900, and was reëlected in 1902 and 1904, resigning in 1905 to become United States Senator. He became active in reform measures, and rose to be the leading spirit in the 'Insurgent' movement in Congress. His action was strongly sustained by the popular vote reëlecting him to the Senate in November, 1910. He vigorously opposed the bill for reciprocity in trade with Canada in 1911. In 1908 he received 25 votes for the presidential nomination, and in 1912 was prominent as a candidate of the 'progressive' Republicans.

Lafontaine (là-foṇ-tān), JEAN DE, a French writer, born at Château-Thierry in 1621; died in 1695. He was invited to Paris by the Duchess de Bouillon, and after being patronized by several persons of distinction Madame Sablière took him into her house, and freed him from domestic cares. He was in habits of intimacy with Molière, Boileau, Racine, and all the first wits of Paris, by whom he was much beloved for the candor and simplicity of his character. But he was no favorite with Louis XIV, who even hesitated some time to confirm his nomination to the French Academy. The first volume of his *Contes* or *Tales* appeared in 1664, a second in 1671. They are full of fine touches of genius, but are grossly indecent. Of his *Fables* (in which animals are represented speaking and acting) innumerable editions have been printed, and it is through them that he is universally known. Lafontaine is also the author of *Les Amours de Psyché*, a romance; *Le Florentin* and *L'Eunuque*, comedies; *Anacreontiques*, etc.

Lager Beer (lä'gėr), a light beer, not so intoxicating as the English pale ales, largely brewed in Germany and Austria. A similar beer is largely produced in the United States.

Lagerlöf (läg'er-löf), SELMA, a Swedish author, born at Marbakaford in 1858. She became a teacher and in 1891 published a collection of tales, *Gästa Berlings Saga*, followed in 1897 by her great romance, *The Miracles of Antichrist*. These were so brilliant in style and character as to win her a foremost place among recent Scandinavian writers. She has since published various other works, and in 1909 was awarded the Nobel prize for literature.

Lagerstœmia. See *Bloodwood*.

Lago Maggiore (mȧ-jō'r e; anciently *Verbānus*), a lake partly in Northern Italy, partly in Switzerland, about 39 miles long and 7 broad, traversed by the Ticino. It is 621 feet above the level of the sea, and at the northern end in some places as deep as 2500 feet. Its banks abound in every Alpine beauty, and are adorned with a number of picturesquely situated villages and towns. On all sides it is

surrounded by hills, and it contains several islands. See *Borromean Islands.*

Lagomys (la-gō′mis), the generic name of the Calling Hares, or Pikas. See *Pika.*

Lagoon (la-gön′), a name given particularly to shallow lakes connected with the sea, which are found along some low-lying coasts, as on that of the Adriatic near Venice.

Lagos (lä′gösh), a seaport town in the south of Portugal, province of Algarve. Pop. 8291.

Lagos (lä′gōs), a British colony on the Bight of Benin, Guinea coast, W. Africa. Area, about 27,000 sq. miles, pop. about 1,750,000. Lagos, the capital, is an important place for commerce, as it is the only point of communication with the outer world for an extensive and fruitful district of the interior. The chief article of commerce is palm-oil. It has a population of 41.874. Acquired by Britain in 1861, Lagos and the Gold Coast were for some time under one governor; but in 1886 Lagos was put under an independent administrator of its own.

La Grange, a city, capital of Troup County, Georgia, 15 miles N. E. of West Point. It has large cotton mills, a large flour mill, and other industries. Pop. 5587.

La Grange, a village in Cook County, Illinois, 15 miles S. W. of Chicago, for which it is a suburban residence town. Pop. 5282.

Lagrange (lā-grānzh), Joseph Louis, a celebrated mathematician, was born at Turin in 1736; died at Paris in 1813. He was of French origin, and his great-grandfather was a cavalry officer in the French army, who afterwards passed ino the service of Sardinia, where he early displayed a natural taste for mathematics. When scarcely nineteen years of age Lagrange was made mathematical professor in the artillery school at Turin. In 1764 he obtained the prize of the Academy of Sciences in Paris for a treatise on the libration of the moon, and in 1776 for another on the theory of the satellites of Jupiter. About this time he made a visit to Paris, where he became personally acquainted with D'Alembert, Clairaut, Condorcet and other savants. Soon after his return he received an invitation from Frederick the Great, to whom he had been recommended by D'Alembert, to go to Berlin, with the title of Director of the Academy. Here he lived for twenty years, and wrote his great work *La Mécanique Analytique.* After Frederick's death (1786) the persuasion of Mirabeau and the offer of a pension induced him to settle in Paris. He was the first professor of geometry in the Polytechnic school, and was the first inscribed member of the Institute. He took no active part in the revolution, and the law for the banishment of foreigners was not put in force against him. In 1794 he was appointed professor in the newly-established Normal School (Ecole Normale Supérieure) at Paris (1794), as well as in the Ecole Polytechnique. Napoleon bestowed upon him distinguished tokens of his favor, and as member of the senate, grand officer of the Legion of Honor, and count of the empire, Lagrange saw himself surrounded with every external honor. But he remained as modest and retiring as ever, devoting himself with the same zeal and industry to his studies. The most important of his works are his *Méeanique Analytique* (1788); *Théorie des Fonctions Analytiques* (1797); *Résolutions des Equations Numériques* (1798); *Leçons sur le Caleul des Fonetions;* and *Essai d'Arithmétique Politique.*

La Guayra. See *Guayra.*

La Harpe (lå årp), Jean François de, a French dramatic poet, critic and philosopher, born at Paris in 1739; died in 1803. He formed a close friendship with Voltaire, whose style he imitated in his numerous dramas, eulogies, etc. About 1786 he began to lecture at the Lycée on literature. On the breaking out of the revolution, La Harpe embraced the principles of republicanism; but during the reign of terror, his moderation rendering him an object of suspicion, he was in 1793 thrown into prison, where his ideas underwent a complete change. After being restored to liberty he continued his lectures and collected them into a separate work (*Lycée ou Cours de Littérature Aneienne et Moderne*), which constitutes his most durable title to fame.

Laharpur (*la*-här-pör′), a town of India, in Oudh, 17 miles N. of Sitapur. Pop. about 12,000.

La Hogue (lå og), a cape of northern France, forming the point of the peninsula on which is Cherbourg, department of La Manche. A naval battle was fought here, May 19, between the French under Tourville and the British and Dutch under Admirals Russell and Rooke, in which the latter were victorious.

Lahore (lä-hōr′), a city of Hindustan, capital of the Punjab, and administrative headquarters of Lahore division and district, on the left bank of the Ravi, 265 miles northwest of Delhi.

It covers an area of 640 acres, and is surrounded by a brick wall 16 feet high, flanked by bastions. The streets are extremely narrow, unpaved and dirty; and the houses have in general a mean appearance. The most remarkable buildings are the mosques of Aurengzebe, of Vizier Khan and of Sonara; the mausoleum of Runjeet Singh, etc. The European quarter lies outside the walls on the south, and dates from 1849. Among the public buildings and institutions are the Punjab University, the Oriental College, Medical School, Law School, Mayo Hospital, etc. In 1524 Lahore became the seat of the Mogul empire, under which it reached its greatest splendor. Before passing into the hands of the British it was the capital of the Sikhs. Pop. 202,964.

Lahr (lär), a town of Baden, 53 miles s. s. w. of Carlsruhe; manufactures textile fabrics, leather, etc. Pop. 13,577.

Lahsa. See *El Hasa.*

Laibach, or LAYBACH (lī'bȧh), a town of Austria, duchy of Carniola, of which it is the capital. It is situated 35 miles northeast of Trieste, on both sides of the river of the same name. Its principal buildings are the Cathedral of St. Nicholas, with fine pictures, frescoes, and carvings; the old Gothic town house; the old castle; the lyceum and other educational institutions. It manufactures woolen and cotton goods, paper, etc. Pop. 36,547.

Laing (lāng), ALEXANDER GORDON, an African traveler, born at Edinburgh in 1793; murdered in 1826. After serving in the army and attaining the rank of major, he entered in 1822 on his career as an African traveler. The results of his early journeys in West Africa were published in 1825. He explored the upper course of the Niger River, and while doing so, was assassinated by his guide near Timbuctoo.

Laing, DAVID, a Scottish antiquary, born in Edinburgh in 1792; died in 1878. He became secretary of the Bannatyne Club, a position which he retained during the 38 years of the society's existence. All the publications of the club came under his superintendence, and in not a few cases he was the actual editor. In 1837 he was appointed librarian to the Society of Writers to the Signet, an office which he held till his death. He was in turn treasurer, secretary, vice-president, and foreign secretary to the Scottish Society of Antiquaries. He published the works of John Knox, with valuable notes; *Select Remains of the Early Popular Poetry of Scotland;* editions of Dunbar's, Henryson's and Sir David Lyndsay's poems; Wyntoun's *Cronykill,* etc., besides editing several of the publications of the Abbotsford and Spalding clubs, and of the Shakespere and Woodrow societies.

Laing, MALCOLM, a Scottish historian, born in 1762; died in 1818. He was called to the Edinburgh bar in 1785. His best known work is the *History of Scotland from the Accession of James VI to the Reign of Queen Anne,* with a dissertation proving the participation of Mary Queen of Scots in the murder of Darnley.

Laisser-faire (lā-sā-fār), in economics, a term applied to the theory that a public authority should interfere in the concerns of a community as little as possible; that wealth tends to be produced most amply and economically where a government leaves individuals free to produce and transfer on mutually arranged terms, confining itself to the protection of property and person and the enforcement of contracts. This rule in practice is limited by various exceptions, as in government interference in the matters of education and the employment of children; in the promotion of health or morality; and in the private economic interests of certain industrial classes.

Laius. See *Œdipus.*

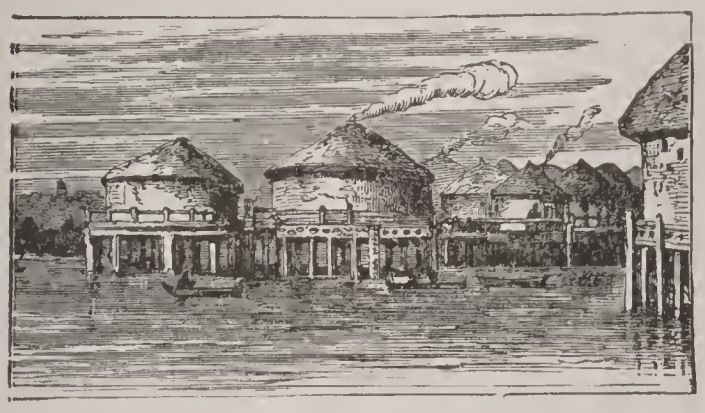
Lake (lāk), a large sheet or body of water, wholly surrounded by land, and having no direct or immediate communication with the ocean, or with any seas, or having so only by means of rivers. It differs from a pond in being larger. Lakes are divided into four classes: (1) Those which have no outlet, and receive no running water, usually very small. (2) Those which have an outlet, but receive no superficial running waters and are consequently fed by springs. (3) Those which receive and discharge streams of water (by far the most numerous class). (4) Those which receive streams, and which have no visible outlet, being generally salt, as the Caspian Sea and Lake Aral.

Lake Charles, a town, capital of Calcasieu parish, Louisiana, on a river and lake of its own name, 219 miles w. of New Orleans. It has several sawmills and other industries. Pop. 11,449.

Lake City, a city, capital of Columbia County, Florida, 60 miles w. of Jacksonville. It has a State Agricultural College and a large trade in fruits, lumber, turpentine, etc. Pop. 5032.

Lake, GERARD, VISCOUNT, a British general, born in 1744; died in 1808. He entered the army in 1758, and served in the Seven Years' war, in America in 1781, and in Holland 1793-94. He attained the rank of general, and was commander-in-chief in Ireland during the trouble of 1797-98, and in India during the Mahratta war (1803), which he brought to a brilliant conclusion. He defeated Holkar in 1805, returned to England in 1807, was made viscount, and appointed governor of Plymouth, where he died.

Lake Dwellings, the name given to habitations built on small artificial or partly artificial islands in lakes, or on platforms supported by piles near the shores of lakes. The use of habitations of this nature is a subject which has engaged the attention of archæologists and others very largely since the discovery of the remains of a lake-dwelling in Ireland in 1839, of similar ones in Switzerland in 1854, and subsequently of numbers of others elsewhere. The archæological interest thus attaching to these lacustrine remains has drawn attention to the fact of similar dwellings being still used in various parts of the world, in Russia, the Malay Archipelago (Borneo and New Guinea), the Caroline Islands, Lake Maracaybo in Venezuela, New Zealand, and in a modified form in some parts of Central Africa. The first who is known to have described lake dwellings is Herodotus, who mentions certain dwellings of this kind on Lake Prasias in Thrace as being approached by a narrow bridge, each habitation having a trapdoor in the floor, giving access to the water beneath, through which fish were caught. A great number of these *pfahlbauten* (pile structures) have been discovered in the Swiss lakes, some belonging to the iron age, some few even to Roman times, but the greater number appearing to be divided in about equal proportions between the stone and bronze ages. The Celtic lake dwellings, called *crannoges,* are more or less artificial islands composed of earth and stones strengthened by piles. Those of Ireland are of a much later date than those of Switzerland, and are frequently noticed in early history as strongholds of petty chiefs. Similar structures are not infrequent in Scotland. The relics found in these buildings have thrown much light on prehistoric man, large populations having occupied these pile-buildings during extended periods of time. Dr. Keller of Zurich first described the lake-dwellings of the European Continent, his work being translated into English under the title of *Lake Dwellings of Switzerland and other Parts of Europe,* by J. E. Lee, 1878. The crannoges of Ireland and Scotland are described in the proceedings of the Royal Irish Academy and the Society of the Antiquaries of Scotland.



Lake-dwellings (restored).—From Troyon.

Lake of the Thousand Islands, an expansion of the river St. Lawrence, soon after it leaves Lake Ontario, between Canada and the State of New York. It contains in all about 1700 small islands.

Lake of the Woods, a lake on the southern frontier of British America, and partly within the United States territory, 220 miles west of Lake Superior. It is upwards of 70 miles in length, has an extremely irregular form, and a coast-line of about 250 miles. It is studded with numerous wooded islands. Rainy River, the principal feeder of the lake, enters it at its southeastern extremity; its discharge is at the north by the River Winnipeg.

Lakes, pigments consisting of a coloring matter combined with a metallic oxide. They are obtained by mixing with a solution of the coloring matter a solution of alum or of a salt of tin, tungsten, zinc, lead, or other metal, and then adding an alkali or alkaline carbonate. Among the pigments prepared in this way may be mentioned *blue* lake, consisting of cobalt blue, indigo, or ultramarine and alumina; *madder* lake, of madder and alumina; *orange* lake, of turmeric and alumina; *carmine* lake, of cochineal and alumina; *purple* lake, of logwood and alumina; and so on. Lake pigments are used in painting, calico-printing, and in the manufacture of wall-paper.

Lake School, or LAKE POETS, a name given by the *Edinburgh Review* to Wordsworth, Southey, Coleridge, Wilson, etc. They had little in common except their non-classicism, and received the name from residing in

the Westmoreland and Cumberland Lake District.

Lakewood, a village in Cuyahoga County, Ohio, 7 miles w. by s. of Cleveland. Wines are produced, and it is a residence place for Cleveland business people. Pop. 15,181.

Lakh. Same as *Lac.*

Lakhimpur (lak-him-pör′), a British district of India, occupying the extreme eastern portion of Assam; area, 4529 sq. miles. It contains valuable forests, and the cultivation of tea has been introduced. Pop. 371,396.

Lakshmî (luksh′mē), in Hindu mythology, the wife of Vishnu. She sprang in full perfection from the froth of the ocean. She is the Hindu Venus, the Ceres or goddess of abundance, and the goddess of prosperity. Flowers and grain are the offerings most commonly given to her.

Lalande (lå-länd), Joseph Jérome le Français de, a French astronomer, born at Bourg-en-Bresse, dep. of Ain, in 1732; died at Paris in 1807. He devoted himself to mathematics and astronomy, and was sent by the academy in 1751 to Berlin to determine the parallax of the moon, while Lacaille went with the same object to the Cape of Good Hope. After having finished his operations at Berlin, he was chosen member of the Academy of Sciences in Paris in the year 1753. Thenceforward no volume of their *Transactions* appeared which did not contain some important communications from him. In 1762 he was appointed professor of astronomy in the Collège de France, where he lectured with immense success to the end of his life. His chief works are his *Treatise on Astronomy; History, Theory and Practice of Navigation;* and *Astronomical Bibliography.* He wrote all the astronomical articles for the great *Encyclopédie,* and rewrote them for the *Encyclopédie Méthodique,* and contributed to various scientific periodicals, besides editing the *Connaissance des Temps* from 1760 to 1775, and from 1794 till his death.

Lalita-Patan (lä-lē′-tä-pä′tän), a town in Northern Hindustan, in Nepaul, near the south bank of the Baghmati, and two miles s. s. w. from Khatmandu, with which it is connected by a bridged road. It is an old place, and contains many Buddhist temples. Pop. 24,000.

Lally-Tollendal (la-le′-tol-en-dal), Thomas Arthur, Comte, born in Dauphiné in 1702, of Irish parents, his father having followed the fortunes of James II. Trained to arms, he was made brigadier on the field of Fontenoy for distinguished bravery. He accompanied the Pretender to Scotland in 1745, and in 1756 he was selected to restore the French influence in India, for which purpose he was made governor of Pondicherry. He utterly failed in this, surrendered Pondicherry in 1761, and was brought prisoner to England. The following month he was allowed to return to France, where, after a long imprisonment, he was condemned and executed (1766) for treachery, etc. His son, supported by Voltaire, obtained in 1778 a complete authoritative vindication of his father's conduct.

Lalo. See *Baobab.*

Lama, in zoology. See *Llama.*

Lamaism (lä′ma-izm), a variety of Buddhism, dating from the seventh century after Christ, and chiefly prevailing in Tibet and Mongolia; so called from the *lamas* or priests belonging to it. The highest object of worship is Buddha, who is regarded as the founder of the religion, and the first in rank among the saints. The other saints comprise all those recognized in Buddhism, besides hosts of religious teachers and pious men canonized after their death. The clergy are the representatives or reincarnations of these saints on earth, and receive the homage due to them. Besides these saints a number of inferior gods or spirits are recognized by Lamaism and receive a certain worship. The Lamaists have a hierarchy in some respects resembling that of the Roman Catholic Church, and they have also monasteries and nunneries, auricular confession, litanies, etc., and believe in the intercession of the saints and in the saying of masses for the dead. In the hierarchy there are two supreme heads, the *Dalai-lama* and the *Tesho-lama,* in whom Buddha is supposed to be incarnate. Next in rank to these two grand-lamas are the incarnations of saints, after which follow those of patrons or founders of lamaseries, or Buddhistic monasteries, and then the

Lama of Tibet.

lower ranks, distinguished merely by talents or learning. The *Dalai-lama* and *Tesho-lama* are nominally co-equal in rank and authority; but the former from possessing a much larger territory is in reality much the more powerful. The former, whose residence is at Potala, near Lassa, is the acknowledged head of the Buddhists not only in Tibet, but throughout Mongolia and China. When either of the two lamas dies, his place may be filled according to directions given by himself before his death, stating into what family he purposed transmigrating. The present lama, infected by political ambition, sought to usurp the sovereignty of Tibet. In consequence, early in 1910, a force of Chinese troops was sent to arrest him and he was forced to flee, taking refuge in British India, where he now holds his court.

Lamar (la-mar'), LUCIUS QUINTUS CINCINNATUS, jurist, was born in Putnam County, Georgia, in 1825. Admitted to the bar in 1847, he served two terms as congressman from Mississippi (1856-1860). In 1861, after taking part in the secession convention of Mississippi, he was sent to represent the Confederate cause in Europe. After the war he was professor of political economy and law professor in the University of Mississippi, and afterwards served in both Houses of Congress, manifesting a fraternal feeling towards the North that attracted general attention. In 1885 he was appointed Secretary of the Interior and in 1887 was made a justice of the Supreme Court. He died in 1893.

Lamarck (lå-mårk'), JEAN BAPTISTE PIERRE ANTOINE DE MONET, CHEVALIER DE, a French naturalist, born in Picardy in 1744; died at Paris in 1829. He devoted himself to the study of medicine and physical science. Among his chief works are *Philosophie Zoologique*, in which he promulgated a famous theory foreshadowing what is now known as the law of evolution; *Histoire Naturelle des Animaux sans Vertebres*, *Tableau Encyclopédique de la Botanique*, etc. His religious beliefs have been described as a curious mixture of pantheism and deism.

Lamarmora (la-mar'mo-ra), ALFONSO, MARQUIS, an Italian soldier and statesman, born in 1804; died in 1878. He left the military academy of Turin in 1823, and thenceforward devoted himself to army reform. He was engaged in checking the revolutionary movements of 1848, and soon after became minister of war. In 1854 he commanded the Sardinian troops in the Crimea. He accompanied Victor Emmanuel to the field in 1859 against Austria, and after the peace became president of the council. He was ambassador to Prussia in 1861, to France in 1867, and was governor of Rome 1870-71.—His elder brother, ALBERTO COUNT LAMARMORA, born in 1789; died in 1863, entered the French army, and was military governor of the island of Sardinia. He published an important account of the island.

Lamartine (lå-mår-tēn), ALPHONSE MARIE LOUIS PRAT DE, a French poet and statesman, was born at Mâcon in 1790; died in 1869. After being educated at the Jesuit school at Belley he spent some years in the country and in traveling, without any definite occupation, devoting himself chiefly to poetry. By his first production, *Méditations Poétiques* (1820), he at once obtained a high place among the poets of the day. In 1820 he was attached to the legation at Naples, and married a rich English lady, Eliza Marianna Birch. The *Nouvelles Méditations Poétiques* (1823) and the *Harmonies Poétiques et Religieuses* (1828), established his poetic fame, and obtained from him admission into the French Academy (1830). After the revolution of July he traveled in the East, and on his return published *Voyage en Orient*, *Souvenirs*, *Impressions*, *Pensées et Paysages* (Paris, four vols., 1835). During his absence he had been elected a member of the Chamber of Deputies, and thenceforward his career was as much political as literary. In 1847 he published his *Histoire des Girondins* (Paris, eight vols.), in which he manifested strong republican leanings. After the February revolution of 1848 he became a member of the provisional government in the capacity of minister of foreign affairs. For some months he enjoyed unbounded popularity, and his energetic behavior was on more than one occasion the means of averting serious evils. After the insurrection of June, 1848, he lost his popularity, and in 1851 withdrew from public life. He was in later years much impoverished, and was voted an annuity in 1867. Among his later works, which did not add to his reputation, were *Histoire de la Restauration*; *Histoire de Turquie*; *Histoire de Russie*; *Le Conseiller de Peuple*; *Le Civilisateur*; *Esprit de Mme. de Girardin*; *Shakespere et son Œuvre*; *Vie de Tasse*. His *Mémoires* appeared in 1871.

Lamb, CHARLES, an English essayist and humorist, born in London in 1755; died at Edmonton in 1834. He was the son of a clerk to one of the benchers of the Inner Temple, and was educated at Christ's Hospital, where he formed his long friendship with Coleridge.

On leaving the hospital he was employed for a short time in the South Sea House, from which he removed in 1792 to an appointment in the accountant's office of the East India Company. Here he remained till 1825, when he was permitted to retire on a pension of £450. The whole course of his domestic life was devoted to the safekeeping and care of his sister Mary, who in a fit of acute mania had stabbed her mother to the heart in 1796. His first appearance as an author was in 1798, when he published a volume of poems in conjunction with his friends Coleridge and Lloyd. His love for seventeenth century literature bore fruit in the *Tales from Shakespere* (1807) and *Specimens of English Dramatic Poets* who lived about the time of Shakespere (1808). He made two attempts at the drama: *John Woodvil*, written in imitation of the early English dramatists; and a farce entitled *Mr. H.*, which was performed at Drury Lane in 1806, and proved a failure. On the other hand, his tale of *Rosamund Gray* (London, 1798) was well received when it appeared, and is still a favorite. He owes his literary distinction to his delightful *Essays of Elia*, chiefly contributed to the *London Magazine*. They have been frequently republished in a collected form. Here, in a style ever happy and original, he has carried the short humorous essay to a point of excellence perhaps never before attained. His sister, Mary Anne (born in 1765; died in 1847), was joint author with her brother of *Mrs. Leicester's School*, *Tales from Shakespere* and *Poetry for Children*.

Lamb, Isaac Wixan, inventor, born at Salem, Michigan, in 1840. His principal invention is a knitting machine capable of producing more than 30 varieties of knit goods and of making 4000 loops a minute at ordinary speed. It can make both flat and tubular work.

Lamballe (loṇ-bal'), Maria Theresa Louisa de Savoie-Carignan, Princess de, was born at Turin in 1749, and married to the Prince de Lamballe, who died the next year. She was the devoted friend and companion of Marie Antoinette, whose sufferings she shared till September 8, 1792, when she was cruelly murdered.

Lambayeque (lâm-bâ-yā'kā), a town in Peru, capital of the department of the same name, 6 miles from the sea, on the river Lambayeque. Pop. 10,500. Area of department, 4614 square miles; pop. (1906) 93,070.

Lambert (lam'bert), Daniel, noted for his extraordinary size, was born in Leicester in 1770; died in 1809. He was exhibited in London and the principal towns of England, and at the time of his death was 5 feet 11 inches in height, weighed 739 lbs. (over 52½ stone), and measured 9 feet 4 inches round the body, and 3 feet 1 inch round the leg.

Lambert, John, parliamentary general during the English civil war; born at Kirkby Malhamdale, Yorkshire, in 1619; died at Guernsey in 1692. He joined the parliamentary army under Fairfax, was colonel at Marston Moor, and major-general in the war in Scotland. He took the lead in the council of officers who gave the protectorate to Cromwell, but he afterwards fell into disgrace, and was deprived by Cromwell of all his commissions, though a pension of £2000 was allowed him for past services. He headed the confederacy which deposed Richard Cromwell, and in 1660 set out for the north to encounter Monk, but was deserted by his troops, seized, and committed to the Tower. At the Restoration he was excepted from the act of indemnity, brought to trial, and condemned to death, but had his sentence commuted to banishment to Guernsey.

Lambert's Pine (*Pinus Lambertiana*), a N. American pine growing in California, and sometimes reaching the height of 300 feet. It yields when burned a sugary substance known as California manna. The leaves are in fives; the cones are 14 to 18 inches long, and contain edible seeds.

Lambese (lom-bes'), a town of Algeria, department of and 62 miles S. W. of the town of Constantine. It is the site of the ancient Lambæsa, and has important Roman remains.

Lambeth (lam'beth), a parliamentary borough of South London, opposite to Westminster, with which it is connected by a bridge 1040 feet long. It has recently become famous for its potteries. Lambeth Palace, the official residence of the Archbishops of Canterbury, contains a library with 30,000 volumes and upwards of 14,000 manuscripts. St. Thomas' Hospital is situated on the Albert Embankment, opposite the Houses of Parliament. The borough is divided into four parliamentary divisions, North, Kennington, Brixton and Norwood. Pop. (1911) 298,126.

Lambeth Articles, a series of nine articles drawn up by Archbishop Whitgift in 1595, embracing the most pronounced doctrines of Calvinism. They were rejected by the queen and parliament, and again at the Hampton Conference, 1604.

Lamego (la-mā'gö), a city of Portugal, in Beira, in a plain near

the Douro, 42 miles east of Oporto. It has an old Gothic cathedral. Pop. 9471.

Lamellibranchiata (la-mel'i-brang-ki-ā'ta), a division of the higher mollusca, represented by the oysters, mussels, cockles, etc., which are distinguished by the possession of a bivalve shell, the absence of a distinct head, and the presence of four lamellar or plate-like gills (whence the name).

Lamellirostres (la-mel-i-ros'trez), a family of swimming birds, distinguished by the flat form of the bill, which is invested by a soft skin, and provided at the edges with a set of transverse plates or 'lamellæ,' through which the mud, in which those birds grope for food, is sifted or strained. The family comprises the ducks, geese, swans, flamingoes, etc.

Lamennais (là-men-ā), Hugues Félicité Robert de, a French writer on religion and politics, born at St. Malo in 1782; died in 1854. He was ordained priest in 1816, and first attracted attention by his apology for Roman Catholicism, the *Essai sur l'Indifférence en Matière de Religion.* In 1824 he declined the offer of a cardinal's hat, and the following year published a work favoring ultramontane doctrines, *La Religion Considérée dans ses Rapports avec l'Ordre Civil et Politique.* From this time he began to preach the separation of church and state, as he believed he could only deliver the former by freeing it from the yoke of the latter. On the outbreak of the July days of 1830 he became a convert to the dogma of the sovereignty of the people. In September of that year he began to publish his *L'Avenir*, which had for its motto, 'God and Freedom.' This journal, which advocated religious and political reforms, was in 1832 condemned by the pope and suppressed. In 1834 he finally revolted from Rome in his *Paroles d'un Croyant* ('Words of a Believer'). This book, which produced an almost unexampled sensation, passed in a few years through more than 100 editions, was translated into almost all living languages, and reprinted in almost all foreign countries. It was condemned by the pope, and Lamennais answered by the *Affaires de Rome.* His subsequent works were all extremely democratic, and he gradually became both atheist and socialist. At the revolution of 1848 he became a member of the national assembly, but after the *coup d'état* he lived in strict retirement.

Lamentations (la-men-tā'shuns), the name given in the authorized version of the Scriptures to a pathetic poem made up of five distinct elegies. They appear in the Hebrew canon with no name attached, but ancient tradition, internal evidence, and a prefatory verse which appears in the Septuagint point to the authorship of Jeremiah. The first four of the dirges are alphabetical acrostics, successive verses, or in chap. iii, successive sets of three verses, beginning alphabetically. Chap. v is not in acrostic form. According to Josephus, Jerome, and also some modern critics, these poems were written on the death of King Josiah (see II Chron., xxxv, 25), but the contents of the book itself plainly show that a national calamity—the destruction of Jerusalem and the overthrow of the Judean state by the Chaldeans—is referred to.

Lamiaceæ (la-mi-ā'se-ē), a synonym of Labiatæ. See *Labiatæ.*

Laminaria (lam-i-nā'ri-a), a genus of dark-spored sea-weeds, having no definite leaves, but a plain ribless expansion, which is either simple or cloven. *L. digitāta* is the well-known tangle on the shores of Great Britain.

Lamination (lam-i-nā'shun), the arrangement of rocks in thin layers or laminæ. This arrangement prevails amongst all the varieties of gneiss, mica, schist, chlorite schist, hornblende schist, etc.

Lammas (lam'mes), one of the four quarterly term days in Scotland, occurring on August 1. The name is from the A.-Sax. *hlâf-mæsse*, that is, *loaf-mass*, bread-feast; so called because on this day offerings were formerly made of the first-fruits of harvest.

Lämmergeier (lam'ėr-gī-ėr; German, 'lamb vulture'), the bearded vulture, a bird of prey of the genus *Gypaëtos* (*G. barbātus*), family Vulturidæ, forming a link between the vultures and the eagles. It

Lämmergeier (*Gypaëtos barbātus*).

inhabits the Swiss and German Alps, as well as the higher mountains of Asia and Africa, and is the largest European bird of prey, measuring upwards of 4 feet from beak to tail, and 9 or 10 in the expanse of its wings. Besides eating carrion, it preys on living chamois, lambs, kids, hares, and such like animals, but when hungry it does not disdain rats, mice and other small quadrupeds.

Lammermuir Hills, a range of Scottish hills stretching in a generally eastward direction from S. E. Midlothian to the German Ocean at St. Abb's Head, and forming part of the boundary between Berwick and Haddington shires. Highest summit Lammer Law, 1733 feet.

Lamnidæ (lam'ni-dē), the porbeagles, a family of sharks.

Lamont (la'mont), DANIEL SCOTT, cabinet official, born at Cortlandville, New York, in 1851; died in 1904. He engaged in journalism, was private secretary to President Cleveland 1885-89, and Secretary of War 1893-97. He then became vice-president of the Northern Pacific R. R. Co.

La Motte (la-mot), JEANNE DE VALOIS, COMTESSE DE, a French adventuress, a descendant of the family of Valois by an illegitimate child of Henry II, and notorious for the part she played in the 'diamond necklace' fraud; born in 1756; died in 1791. She married the Comte de la Motte, a penniless adventurer, and settled in Paris about 1780. In the years 1783-84 the Prince-cardinal de Rohan, who had fallen into disgrace, was persuaded by her that the Queen Marie Antoinette regarded him with much favor, which would be increased if he would assist her in purchasing a valuable diamond necklace which Louis XV had ordered for Madame du Barry, but which was still in the jeweler's hands. The cardinal fell into the snare, he agreed to stand surety for the payment, and the necklace was delivered to him. There is here yet somewhat of mystery. Cagliostro, and probably the queen also, was in the plot; the necklace disappeared, was broken up and sold, probably by the La Mottes. The jeweler, after waiting a long time for his money, applied direct to the court, and the plot was discovered. Cagliostro, the cardinal, and others were thrown into the Bastille, but at the trial only the La Mottes were convicted. They escaped to England, where the comtesse wrote *Mémoires* implicating the queen in the fraud. She was killed by falling out of a window. Her husband lived a miserable wandering life till his death in 1831.

La Motte Fouqué (fö-kā). See *Fouqué.*

Lamp, a contrivance for producing artificial light, whether by means of an inflammable liquid, or of gas, or electricity; but usually the term applied to a vessel for containing oil or other liquid inflammable substance, to be burned by means of a wick. Baked earth was probably the substance of which the earliest lamps were composed, but subsequently we find them of various metals—of bronze more particularly. Modern lamps vary in form and principle widely, and of late have been constructed in a variety of materials. The requisite properties of a perfect lamp are these:—1. It must be supplied with carbonaceous matter and with oxygen. 2. It must convert the former into a gaseous state. 3. It must bring the gas so produced in contact with oxygen at such a temperature that the carbon will combine with the oxygen in the fullest degree to produce the greatest quantity of flame without any smoke. Until 1784 all the lamps in use were far from meeting all these requirements. In that year an improved scientific lamp was constructed by Aimé Argand of Geneva, and called, after him, the Argand lamp. In this lamp defective consumption is remedied by using a circular wick, the flame of which is nourished by an internal as well as an external current of air, and by placing a glass chimney above the flame so as to increase the draught. A special arrangement ensures a uniform supply of oil. In the improved lamps that have succeeded that of Argand, the Argand burner has generally been retained, and the alterations have chiefly been made in the mode of keeping up a uniform supply of oil. The moderator lamp, invented by M. Franchot in 1837, long held a favorite place. In it the oil is contained in a reservoir at the bottom of the lamp. The reservoir is cylindrical in shape, and in the interior there is a piston which is pushed down on the oil by a spiral spring, causing the oil to ascend in the tube in which the wick is inserted. Since the invention of this lamp various modifications have been made in it by different manufacturers. For petroleum, paraffin and other mineral oils, which have of late years come into very extensive use for illuminating purposes, a very simple kind of lamp is used. The oil-vessel is placed below the burner, which usually consists of a simple slit, down which a broad wick passes into the oil. The wick may be raised or depressed by a screw, and when the lamp is burning is kept a short distance below the opening of the slit. The

oil is sucked up by the wick by the action of capillarity. A chimney is fitted on to the lamp, and creates so powerful a draft that the flame is kept perfectly steady, and the gas proceeding from the heating of the oil is completely consumed. There is an endless variety of lamps of this kind, the special features aimed at being increase of light by improved burners and immunity from explosion. Safety-lamps are used for mines (see *Safety-lamp*). Hydrocarbon lamps are used for magic lanterns, etc. The magnesium lamp, chiefly used by photographers, is one constructed for the combustion of magnesium wire. A *lantern* is a form of lamp, generally a case enclosing a light and protecting it from wind and rain, sometimes portable and sometimes fixed.

Lampblack, a fine soot formed by the condensation of the smoke of burning oil, pitch, or resinous substances in a chimney terminating in a cone of cloth. It is used in the manufacture of pigments, blacking and printing inks. See *Carbon*.

Lampedusa (lăm′pā-dō′sȧ), a small island of the Mediterranean, about midway between Sicily and the coast of Tunis. It is about 13 miles in circumference; produces wine and fruits; has a small harbor, and 1074 inhabitants. It belongs to Italy.

Lamprey (lam′pri), the popular name of several species of fishes forming the genus *Petromyzon* of the order Marsipobranchii; eel-like, scaleless fishes which inhabit both fresh and

Sea Lamprey (*Petromyzon marīnus*).

salt water. The lampreys have seven spiracles or apertures on each side of the neck, and a fistula or aperture on the top of the head; they have no pectoral or ventral fins. The mouth is in the form of a sucker, lined with strong teeth and cutting plates, and the river lampreys are often seen clinging to stones by it. The marine or sea lamprey (*P. marīnus*) is sometimes found so large as to weigh 4 or 5 lbs. It is of a dusky brown, marbled with yellowish patches, is common round the Atlantic coast of Europe, and is also found in the Mediterranean. It ascends rivers in the spring for the purpose of spawning, and was formerly much valued as an article of food. The river lamprey or lempern (*P. fluviatĭlis*) is a smaller species, and abounds in the fresh-water lakes and rivers of northern countries. It is colored black on its upper and of a silvery hue on its under surface. Lampreys attach themselves to other fishes and suck their blood; they also eat soft animal matter of any kind.

Lamp-shells, the familiar designation of certain Brachiopodous Molluscs, especially those of the genus *Terebratŭla*, the bivalve shells of which when closed bear a close resemblance to the shape of the old Roman or classical lamp.

Lampyris (lam′pi-ris), the name of a genus to which the glow-worm belongs.

Lamu (lä-mö′), an island and town on the coast of East Africa, lat. 2° 20′ s., the administration of which was granted in 1889 to the Imperial British E. Africa Co. Pop. 15,000.

Lanark (lan′ark), LANARKSHIRE, or CLYDESDALE, an inland south-western county of Scotland, and the most populous in the country. Area, 879 square miles. The southern part is mountainous, the Lowther Hills reaching an elevation of 2400 feet. The mineral wealth consists of rich beds of coal, ironstone, limestone and sandstone, which are extensively wrought. The principal river is the Clyde, which traverses the entire county from S. S. E. to N. N. W., and for the greater part of its course nearly through its center. The county contains the large city of Glasgow. Pop. 1,339,327. —LANARK, the county town, situated on elevated ground near the right bank of the Clyde, 31 miles southeast of Glasgow. It is a very ancient place, and was erected into a royal burgh by Alexander I. Not far from Lanark are the Falls of the Clyde, in a romantic and richly wooded part of the valley, which render the town a favorite resort for tourists. Pop. 6440.

Lancashire (lan′kȧ-sher), or the county palatine of Lancaster, a maritime county in the N. W. of England, bounded by Westmoreland, Cumberland, Yorkshire, Cheshire and the Irish Sea, has an area of 1880 square miles. The coast is of great extent, and is deeply indented by bays and arms of the sea, the principal of which are Morecambe Bay and the estuary of the Ribble. In the north the surface is rugged and mountainous; elsewhere it is generally level. The peat-mosses or bogs of Lancashire form one of its most remarkable physical features. The most extensive of these is Chat Moss (which see). The most important mineral product of Lancashire is coal, which

occurs abundantly in the south and southwest. Another valuable product is the hæmatite iron ore, the output of which has increased with extraordinary rapidity of late years. Excellent freestone is quarried near Lancaster. Limestone occurs abundantly. Lancashire is the great seat of the cotton manufacture, not only of England, but also of the world, Manchester being the principal center. Woolen goods are also largely produced, as are also machinery of all descriptions, and a vast variety of other articles. Liverpool is the great shipping port of the county and of England. Lancaster is the county town, but there are a great many others far larger, such as Liverpool, Manchester and Salford, Oldham, Bolton, Blackburn, Preston, etc. Pop. 4,768,474.

Lancaster (lan'kas-ter), a municipal borough and river-port, England, the county town of Lancashire, on the left bank of the Lune, 45 miles north by east of Liverpool. It occupies the acclivities of a hill, on the summit of which stands the castle, now used as the county jail, built in the reign of Edward III, but with a keep supposed to be Saxon, and with a tower on the southeast attributed to the Emperor Hadrian. The industries comprise furniture, cordage, sail-cloth and cotton goods, floor-cloth, oil, varnish works, railway rolling stock, etc. Pop. (1911) 41,414.

Lancaster, a city of Pennsylvania, the capital of Lancaster County, 68 miles west of Philadelphia. It has extensive manufacturing interests, and is a chief tobacco-leaf market, tobacco being grown largely in the surrounding district. It is also the center of a rich wheat district, and carries on an extensive lumber trade. Lancaster was settled about 1720, was the capital of the State from 1799 to 1812, and was incorporated as a city in 1818. Pop. 47,227.

Lancaster, a city, capital of Fairfield County, Ohio, on the Hocking River, about 32 miles S. E. of Columbus. It has numerous large industries, including iron foundries, flouring mills and manufactures of machines and agricultural implements, flint and window glass, boots and shoes, etc. Pop. 13,093.

Lancaster, Duchy of, a duchy annexed to the English crown in the reign of Edward IV, and which had separate courts of its own till the passing of the Judicature Act of 1873. Its revenues go directly into the privy purse of the sovereign, and are not reckoned among the hereditary revenues surrendered for the Civil List. The revenue is over £30,000. The chancellorship is a political appointment, and the chancellor is generally a member of the cabinet. The duties are nominal.

Lancaster, House of, the name given in English history to designate a line of kings. Edmund, second son of Henry III, was created Earl of Lancaster and Leicester. His son Thomas added Derby and Lincoln to his titles, became leader of the baronial opposition to Edward II, and was beheaded for treason. His grandson was advanced to the dignity of a duke, and dying without male issue, the inheritance fell to his daughter Blanche, who became the wife of John of Gaunt, who was the fourth son of Edward III. From him descended the kings, Henry IV, V and VI, of the House of Lancaster.

Lancaster, John of Gaunt, Duke of. See *John of Gaunt.*

Lancaster, Joseph, the propagator of the educational system which is coupled with his name and that of Dr. Andrew Bell, was born in London in 1778; died at New York through a carriage accident in 1838. In 1798 he opened a school for children in Southwark, which he conducted on the Madras system, which had been previously made known by Dr. Bell. (See *Bell, Andrew.*) The principal features of the system were the teaching of the younger pupils by the more advanced students, called monitors, and an elaborate system of mechanical drill, by means of which these young teachers taught large numbers at the same time. He soon found powerful support, and was able to erect a schoolhouse, which in 1805 was attended by 1000 children. The number of his patrons and the amount of subscriptions continuing to increase, he founded a normal school for training teachers in his system, which he now hoped to be able to extend over the whole kingdom. He made extensive tours through Great Britain and Ireland, and in 1811 had founded 95 schools, attended by 30,000 children. He was reckless and improvident in his habits; became bankrupt, and emigrated to America in 1818, where he at first received some support, but ultimately fell into poverty.

Lancaster Gun, named from the inventor, a species of rifled but not grooved cannon, having an elliptical bore, of which the major axis moves round till it traverses one-fourth of the circumference of the bore. The projectiles are also elliptical, so that when the gun is fired the projectile follows the twist of the bore, acquiring a rotary motion.

Lancaster Sound, a passage leading from the northwest of Baffin Bay west to Barrow Strait. It was discovered by Baffin in 1616, is about 250 miles long, with a central breadth of about 65 miles.

Lance (lans), a weapon consisting of a long shaft with a sharp point, much used before the invention of firearms, and still in use. It was common among the Greeks and Romans. The Macedonian phalanx was armed with it, and it was the chief weapon of the Roman infantry. The javelin, or *pilum*, was but secondary. The lance was the chief weapon in the middle ages, and was especially the arm of knighthood. The introduction of firearms gradually led to the disuse of the lance in the West of Europe, though it continued among the Turks, Albanians, Tartars, Cossacks, Poles and Russians, and other Slavonic tribes. Napoleon organized several regiments of Polish lancers for service in his army, and now most of the armies of Europe have regiments of Uhlans or lancers.

Lancelet (lans'let; *Amphioxus lanceolātus*), a singular fish, 2 or 3 inches long, with a slender, compressed, transparent, lance-shaped body, occurring in shoal water in the temperate and torrid parts of the earth. It forms the sole member and representative of the order Pharyngobranchii or Leptocardii. No true or paired fins are represented, and in the other parts of its anatomy the low organization of the creature is readily appreciable. The vertebral axis consists of a slender rod (*notochord*) pointed at each end, and composed of the softest of cartilage. There is no skull. The mouth is of oval shape, situated below and slightly behind the front part of the body, and there are no true jaws. It is surrounded by a ring of gristly matter, which supports small pieces of the same material; and these latter give origin to a number of delicate ciliated filaments or *cirri*. The mouth leads backwards into a very large dilated chamber representing the expanded pharynx, which performs the part of a breathing organ; and the walls or sides of the pharynx are perforated by transverse clefts or fissures, whilst the inner lining of the chamber is plentifully provided with vibratile filaments or cilia. Breathing takes place by the admission of water through the mouth into the dilated pharynx, the effete water passing through the slits or clefts in the sides of the sac into the cavity of the abdomen, whence it escapes outwardly by an opening known as the 'abdominal pore.' The circulation of the blood, which is destitute of color, is performed by contractile dilatations situated upon the main blood vessels, the heart being a simple expansion of the principal vein. The digestive system consists of a stomach and straight intestine. This animal has been pressed into the service of recent theories regarding the origin of living beings, as tending to illustrate how the higher and Vertebrate groups of animals may have become developed from lower and Invertebrate forms. Six species in all are known, one from Australia being regarded by some as a distinct genus.

Lancelot of the Lake (lan'selot), the name of one of the paladins celebrated in the traditions and fables relating to King Arthur and the Round Table. According to tradition, Lancelot was the son of Ban, king of Brucic, was educated by the fairy Viviana (the Lady of the Lake), and became one of the chief knights of Arthur's court. His love for Genevra, or Guinevere, the beautiful wife of Arthur, and his disregard of Morgana, a fairy, and the sister of Arthur, placed the knight in the most dangerous and marvelous situations, from which, however, he always extricated himself by his valor and the assistance of the Lady of the Lake. *Le Roman de Lancelot du Lac*, a famous mediæval romance, compiled by Walter Mapes (1150-96), has appeared in many forms. Lancelot is one of the chief figures in Tennyson's *Idylls*.

Lancerote. See *Lanzarote*.

Lancers. See *Lance*.

Lancet Window (lan'set), a high and narrow window with an acutely angled arched top. Lancet windows are a marked characteristic of the early English style of Gothic architecture, and are in a great degree peculiar to England and Scotland. They are often double or triple, and sometimes five are placed together, as in the window called the 'Five Sisters' at York. See *Early English Architecture*.

Lancewood (lans'wöd), the popular name of the wood of several trees of the order Anonaceæ, as of the *Oxandra virgāta*, a native of Jamaica, *Duguetia quitarensis*, a native of Cuba and Guiana, which possesses in a high degree the qualities of toughness and elasticity, and is on this account extremely well adapted for the shafts of light carriages, and all those uses where light, strong, but elastic timber is required.

Lanciano (lân-chä'nō), a town of Southern Italy, in the

province of Chieti (Abruzzo-Citeriore), the see of an archbishop. Pop. 18,316.

Land, forms an important kind of natural wealth susceptible of appropriation, and forming at the same time the principal deposit of the accumulated capital derived from the labor of preceding generations. In Britain, from various causes, among others the enormous cost of transfer, the land is in the hands of comparatively a few owners, and the properties are generally large. One-half of the land of the United Kingdom is in the hands of 7400 individuals; the other half being owned by 312,500 individuals. Barely one in a hundred of the population owns more than an acre of soil. This state of affairs does not exist to so great an extent in any other country. In France there are about 3,000,000 properties under 25 acres, only 150,000 above 100 acres; 1,750,000 of the population cultivate their own land. Small holdings cultivated by the owners are common in Germany, Belgium, Switzerland, Denmark, Norway, Sweden, Italy and other parts of Europe. The same is the case in the United States and the British colonies, the great estates being of minor importance as compared with the small farms.

Land, Tenure of. The various species of tenures and customs relating to property in land are noticed under the particular heads. See *Allodium*, *Feudal System*, *Fee*, *Fee-farm*, *Copyhold*, *Entail*, etc.

Landau (län'dou), a town of Rhenish Bavaria, on the river Queich, 47 miles N. N. E. of Strasburg. It was formerly strongly fortified, and has been the scene of many stirring events. Pop. (1905) 17,165.

Land-crabs, crabs so called from their semiterrestrial mode of life, their habits leading them to live on land, and away from the sea, even for considerable periods of time. The true land-crabs (genus *Gecarcĭnus*) occur in Asia, particularly in the Eastern Archipelago; in America, and specially in the West Indian Islands; and in Australia also. The best-known species is *G. ruricŏla*, found in the higher parts of Jamaica, which often proves very destructive to the sugar plantations. The crabs of the genus *Cardisōma*, represented by the common species *C. carnifex*, and inhabiting the West Indian mangrove swamps and marshes, appears to feed upon both vegetable and animal diet. Among other species of land-crabs may be enumerated the sand-crabs (*Ocypŏda*), the beckoning or calling crabs (*Gelasimi*) and the *Thelpusæ*, which inhabit fresh-water streams, but appear to be equally at home when on land.

Lander (lan'dėr), Richard, an African traveler, born at Truro, England, in 1804; died in 1834. He accompanied Captain Clapperton on his last expedition as servant, and in 1830 he set out with his brother John (1807-39) on an exploring expedition under the auspices of the British government. He was able to lay down with approximate correctness the lower course of the Niger, and proved that it entered the sea by several mouths at the Bight of Benin. In the beginning of 1834, while on a trading expedition in the delta of the Niger, he was wounded by the natives, and though he was able to reach Fernando Po, he died soon after. He published *Records of Captain Clapperton's Last Expedition in Africa, with R. Lander's Journal*, 1829; *Journal of an Expedition to Explore the Course and Termination of the Niger*, 1832.

Landerneau (län-der-nō), a seaport of France, department Finistère, 13 miles northeast of Brest. Pop. 5779.

Landes (länd), a term specifically applied in France to extensive level and largely barren tracts stretching from the mouth of the Garonne along the Bay of Biscay and from 60 to 90 miles inland, bordered with sand hills next the sea. They bear chiefly heath and broom, but on the seaward side are largely planted with the maritime pine, and considerable stretches have been reclaimed. The inland plains are chiefly occupied as sheep-runs. The inhabitants lead a sort of nomadic life. The landes are dry in summer and marshy in winter, and stilts are much used by the inhabitants in traversing them.

Landes, a maritime department of France, bounded by the Bay of Biscay and by the departments of Gironde, Lot-et-Garonne, Gers and Basses-Pyrénées. It has an area of 3599 square miles. It contains three arrondissements, Mont-de-Marsan (the capital), Dax and St. Sever. Forests are extensive, and are gradually taking the place of the *landes* (see above article). The fertile lands consist chiefly of the alluvial valleys to the south of the Midouze and the Adour. The *dunes*, a sandy tract covered with pines, stretch along the coast of the department to a depth of about 3 miles. The vine is cultivated to a considerable extent in the fertile districts. Pop. (1906) 293,397.

Landeshut (län'des-höt), a town of Prussia, in Silesia, district of Liegnitz, in a beautiful valley at

the foot of the Riesengebirge. Pop. (1905) 9000.

Landgrave (land'grāv; German, *Landgraf*), in Germany, originally, about the twelfth century, the title of district or provincial governors deputed by the emperor, and given them to distinguish them from the inferior counts under their jurisdiction. Later, it was the title of three princes of the empire, whose territories—Thuringia, Lower and Higher Alsace—were called landgraviates.

Land League, an organization projected by Mr. Parnell, the leader of the Irish national movement, in 1879, the ostensible object of which was to purchase the land of Ireland for the people of Ireland. Funds were largely subscribed, especially in America, but the stringent rules against landlords and tenants holding aloof from it, and the alleged complicity of its members with many terrible outrages, caused it to be suppressed in 1881.

Landlord and Tenant. The landlord in relation to a tenant is the person from whom lands or tenements are taken on lease (see *Lease*), or by some other contract or agreement. The tenant is the person who holds lands or tenements of another by any kind of contract or agreement, usually for a periodical rent. The laws governing tenancy vary in different countries. In the United States the statutes generally allow leases for only one year, or less, to be created by oral agreement, all others being required to be put in writing; and in some of the States they are also required to be under seal. Tenancies at will may still, as at common law, be created by oral agreement, followed by the entry or occupancy of the tenant. In cases where a tenant holds over the landlord may treat him as a trespasser, and eject him accordingly. If he forbears to do this the trespass is condoned and the wrongdoer acquires a certain legal status. In this case the latter becomes a tenant at will. If the landlord accepts rent and recognizes his right to enjoy possession for certain periods of time, the tenant must be treated as a tenant from year to year, or from month to month as the case may be. In such cases the terms of the new tenancy are usually determined by the terms of the expired lease. It is customary, however, to stipulate in leases that notice must be given by either party of his intention to terminate the lease at its expiration. As the statutes of the several States greatly vary, no special details bearing on this subject can be given.

Landon (lan'dun), Letitia Elizabeth, an English poetess, better known by her initial signature of L. E. L., was born in 1802; died at Cape Coast Castle, in 1839. She wrote much for the then fashionable annuals, and the romantic gloom and melancholy of her verses gave them a charm for many people. In 1838 she was married to a Mr. George MacLean, and sailed with him to Cape Coast Castle in Western Africa, where he was governor. She died there soon after her arrival, from an accidental overdose of prussic acid, which she had been in the habit of using medicinally. Her chief works are: *The Improvisatrice; The Troubadour; The Golden Violet, etc.; The Venetian Bracelet, etc.; The Lost Pleiad; Ethel Churchill*, a novel; and *Romance and Reality*, a novel.

Landor (lan'dur), Walter Savage, an English poet and prose writer, born at Ipsley Court, Warwickshire, in 1775; died in 1864. He was educated at Rugby and Oxford, from both of which he was expelled for unruliness. He published a small volume of poems in 1795, and a lengthy poem, *Gebir*, in 1798. This latter he subsequently translated into Latin verse, being one of the most accomplished Latinists of his time. He succeeded to a large property on the death of his father, but he soon sold it off, determining to live abroad. In 1808 he raised a body of men at his own expense for the defense of Spain against France. In 1811 he married a Miss Thuillier of Bath, and settled at Florence, where many of his works were written. Having separated from his wife, he returned to England in 1835. In 1857 the publication of some ugly slanders against a lady of Bath led to a prosecution for libel, and Landor was brought in for £1000 damages. He left England, and once more found a resting place in Florence, where he died. His fame chiefly rests on his *Imaginary Conversations*, between celebrated persons of ancient and modern times, which is a model of a pure, vigorous, finished English style. Among his other works are *Count Julian*, a tragedy; *Hellenics*, or Greek poems; *Pericles and Aspasia*, imaginary letters; *Pentameron and Pentalogue;* and the dramas *Andrea of Hungary* and *Giovanna of Naples*. His biography has been written by John Forster.

Land-rail, or Corn-crake. See *Corncrake*.

Landrecies (lāṇ-dr-sē), or Landrecy, a small French town, on the Sambre, dep. of Nord. It was formerly fortified, and played an important part in the French wars. Pop. about 3000.

Landsberg (lånts'berg), a town of Prussia, province of Brandenburg, and 37 miles northeast of Frankfurt, on the Wartha. It has manufactures of engines and boilers, carriages, woolens, tobacco, spirits, etc. Pop. (1905) 36,934.

Landscape (land'skāp), a term applied to a portion of land or territory which the eye can comprehend in a single view, and to a painting of such. See *Painting.*

Landscape Gardening, is the art of laying out grounds, arranging trees, shrubbery, etc., so as to bring into harmonious combination all the varied characteristics and surroundings. It disposes flowering plants, shrubs and trees over varying levels in such a manner as to produce the most pleasing effects, it shuts out undesirable views by means of judicious planting, and introduces rock-work, water and other artistic embellishments where the local peculiarities of the ground permit.

Landseer (land'sēr), Sir Edwin, animal painter, born in London in 1802; died in 1873. He began to draw animals when a mere child; at thirteen he exhibited at the Academy, and the year following became a student. Thenceforward he exhibited regularly at the Academy and the British Institution. In 1826 he was elected A.R.A.; in 1830, R.A.; in 1850 he was knighted, and in 1865 he declined the presidency of the Academy. He takes the very highest rank among animal painters; and though he has been blamed for introducing too human a sentiment and expression into some of his animals, the humor and pathos of animal nature has had no finer exponent. Among his best-known works are: *The Return from Deerstalking, Bolton Abbey in the Olden Time; The Return from Hawking; The Shepherd's Chief Mourner; A Distinguished Member of the Humane Society; There's Life in the Old Dog Yet; Laying Down the Law; The Stag at Bay; Monarch of the Glen;* the celebrated work of sculpture, the lions at the base of Nelson's monument, Trafalgar Square, London, etc.—Charles Landseer, brother of the above (born in 1799; died in 1879), had a good reputation as a painter of subjects from English history and poetry. He was chosen Academician in 1845, and keeper of the Academy in 1851.—Thomas Landseer, also a brother (born in 1795; died in 1880), was celebrated as an engraver, and made many reproductions of his brothers' works.—John Landseer, engraver, father of the above (born in 1769; died in 1852). He was elected associate engraver of the Academy, 1807; lectured on and published several treatises on art.

Land's End, a headland in Cornwall, forming the southwestern extremity of England (lat. 50° 6′ N., lon. 5° 45′ W.). There is a lighthouse on the rocks, called Longships, about a mile to the west.

Landshut (lånts'höt), a picturesque old town of Bavaria, on the Isar, 40 miles N. E. of Munich. It has many interesting buildings, among which are St. Martin's Church, a fine Gothic structure built in 1407-77, with a steeple 462 feet high; the royal palace, the town house, and the old castle of Trausnitz. Landshut has manufactures of leather, starch, machinery, carriages, tobacco, paper, etc. It formerly had a university, transferred in 1800 from Ingolstadt, but removed to Munich in 1826. Pop. (1905) 23,217.

Landshut, a town of Prussia. See *Landeshut.*

Landskrona (låns-krö'nå), a seaport of Sweden, län Malmö, on a tongue of land projecting into the Sound, 15 miles N. N. E. of Copenhagen. Its harbor is the best on the Swedish coast of the Sound. Pop. 14,399.

Landslip (land'slip), the slipping or sliding of a considerable tract of land or earth from a higher to a lower level. Landslips are due to a variety of causes, chiefly the decay of supporting strata or excessive saturation of the soil by rain. Among the more disastrous occurrences of this kind are the slip of the Rossberg Mountain behind the Rigi in Switzerland in 1806, burying villages and hamlets with over 800 inhabitants; and that at Naini Tal, a sanitary hill-station in the Himalayas, in 1880, when 230 lives were lost.

Lands, Public. See *Public Lands.*

Landsturm (lånt'sturm), a local militia of Germany, which is never called from its own district but in case of actual invasion. It comprises that portion of the reserve too old for the *Landwehr* (which see). Other European nations have a force of the same nature.

Land Surveying. See *Surveying.*

Land Tax, a tax levied on land. What is known as the land tax in Britain was imposed in the reign of William III as a substitute for escuage, talliage, fifteenths, and other contributions. It was imposed annually from 1693 to 1798 at a varying rate, oftenest 4*s.* per pound. In the latter year it produced about £2,000,000, when it was re-

placed by a perpetual rent charge on land, with power of redemption, and a tax annually imposed on personal property, the latter tax abolished in 1833. In the land tax provision of the 1910 budget, the rates on landed property were considerably increased.

Landwehr (länt'vār), that portion of the military force of Germany and other European nations which in time of peace follow their ordinary occupations, excepting when called out for occasional training. The landwehr in some respects resembles a militia, with this important difference, that all the soldiers of the landwehr have served in the regular army. This system has received its fullest development in Germany, in which country it adds enormously, and at comparatively little cost, to the military power of the state.

Lane (lān), EDWARD WILLIAM, an Arabic scholar, son of Dr. Theophilus Lane, prebendary of Hereford; born in 1801; died in 1876. He was intended for the church, but formed a strong desire to visit Eastern countries, and turned his attention to the study of Oriental languages. He made two long visits to Egypt, living like an Oriental, his singular tact in accommodating himself to the Eastern character giving him great insight into the modes of Eastern life and thought. His works, which are highly valued, comprise *Manners and Customs of the Modern Egyptians;* a translation of the *Arabian Nights*, with valuable notes; *Selections from the Koran;* and an unfinished *Arabic Lexicon.*

Lanfranc (lan'frank), Archbishop of Canterbury, son of a wealthy citizen of Pavia; born in 1005; died in 1089. He became a monk of the Benedictine abbey of Bec in 1042 and prior in 1046. In 1062 William of Normandy made him abbot of Caen, and after the Conquest he became archbishop of Canterbury (1070). He did much to purify and reform the church, at the same time preserving its insular independence. He enjoyed the confidence of William I and promoted the peaceable succession of William Rufus, under whom he exercised the chief authority till his death. His writings were printed in 1647, and again at Oxford in 1844.

Lanfrey (lāṇ-frā), PIERRE, a French historian, born in 1828; died in 1877. His life was entirely literary till the outbreak of the Franco-German war, when he joined the *garde mobile.* He was elected a member of the assembly in 1871, was ambassador to Switzerland in 1873, and made life senator in 1875. His chief work is his *History of Napoleon I,* in which he endeavors with unsparing pen to paint the man as he really was.

Lang, ANDREW, miscellaneous writer, born at Selkirk, Scotland, in 1844; educated at Edinburgh Academy, St. Andrew's University and Balliol College, Oxford, where he took a distinguished position. A most versatile writer, he has published several volumes of ballades and other light verse; *Custom and Myth*, a valuable contribution to the science of comparative mythology; the article *Mythology* in the *Encyclopædia Britannica;* translations of Homer (with other collaborators) and of Theocritus, *History of Scotland*, 3 vols., his most valuable work, and numerous other works on varied topics. With A. E. W. Mason he wrote the humorous novel, *Parson Kelly.* He was a frequent contributor to the daily press and to periodical literature. Died in 1912.

Lange (lang'ė), JOHANN PETER, a German theologian, born in 1802; died in 1884. He studied theology at Bonn; was appointed professor of theology at Zürich in 1841, and at Bonn in 1854. His chief works, *Life of Jesus*, *Christian Dogmatics*, *Apostolic Age*, etc., have been translated into English, including the work well known under the title of *Lange's Commentary.*—FRIEDRICH ALBERT LANGE, son of the above, born in 1828; died in 1875, is author of a *History of Materialism* and other philosophical works.

Langeland (lång'e-lån), an island of Denmark between Laaland and Fünen, about 30 miles in length and from 3 to 5 in breadth; area, 103 square miles; pop. 18,901. This island is fertile in every part. Rudkjöping is the chief town.

Langensalza (lång'en-zål-tså), a town of Prussia, in the province of Saxony, 20 miles northwest of Erfurt, on the Salza. It is a busy place, with cloth and other factories. Three battles have been fought in the vicinity, in 1761, 1813 and 1866, the Hanoverians being defeated by the Prussians in the last. Pop. (1905) 12,545.

Langholm (lang'om), a market town of Scotland, Dumfriesshire, on the Esk, 30 miles east by north of Dumfries. It consists of two parts—Old Langholm on the E. bank of the Esk and New Langholm on the W. bank—and is celebrated for its sheep fairs and its woolen manufactures. Pop. 3142.

Langhorne (lang'hōrn), JOHN, an English poet and miscellaneous writer, born in 1735; died in 1779. He published numerous poems, but his chief work, done in conjunction with

his brother William (1721-72), is a translation of *Plutarch's Lives*, which still holds a good position. He was prebend of Wells Cathedral at his death.

Langlande (lang'land), or LONGLAND, WILLIAM, the supposed author of the English poem, *The Vision of William concerning Piers Plowman*, was born about 1332, perhaps at Cleobury-Mortimer, Shropshire; and is traditionally reported to have been a secular priest, educated at Oxford. From internal evidence it is gathered that the poem, in its earliest form, was composed about 1362. Its rhythmical structure depends upon alliteration, which forms a substitute for rhyme. The poem is allegorical in form and satirical in spirit; the trials and troubles of life generally, but more particularly the corruptions of the church and the worldliness of the ecclesiastical order, are its theme. *The Crede of Piers Plowman* is an imitation of Langlande's work which appeared about the end of the fourteenth century. It is written by a follower of Wickliffe. There are three chief texts of *Piers Plowman*, to which are assigned the respective dates of 1362, 1377 and 1393. These have all been published by the Early English Text Society (1867, 1869, and 1873) under the editorship of Mr. Skeat. *Piers Plowman*, besides being of value for its pictures of old English life, is of very great importance for the study of English in its earlier forms. Langlande is said also to be author of a poem written in 1399, which Skeat has titled *Richard the Redeles*.

Langley (lang'li), SAMUEL PIERPONT, astronomer, was born at Boston, Massachusetts, in 1834; died in 1906. He was graduated at the Boston High School, was a professor in the U. S. Naval Academy and in 1887 became Secretary of the Smithsonian Institution. He designed a system of railway time service which came into common use, discovered an extension of the invisible solar spectrum, and was one of the first to experiment in the flight of heavier-than-air machines. He wrote *The New Astronomy*, *Researches on Solar Heat*, etc.

Langobardi. See *Lombards*.

Langres (lâṇ-gr), a town in France, department of Haute-Marne, near the left bank of the Marne, 22 miles S. S. E. of Chaumont. It occupies a steep hill commanding the entrance from the basin of the Saône into that of the Seine, and is a fortress of the first class. It has a cathedral, chiefly Romanesque but partly Gothic, dating from the twelfth century. Pop. (1906) 6663.

Langtoft (lang'toft), PIERRE DE, an English historian, canon of Bridlington, Yorkshire, in the reigns of Edward I and Edward II, author of a Norman-French chronicle of England to the end of the reign of Edward I. It has been published in the Rolls Series, and was translated into English rhyme by Robert de Brunne.

Langton (lang'tun), STEPHEN, an English cardinal, and Archbishop of Canterbury in the reign of John, born about 1150. In 1206 Innocent III created Langton a cardinal and nominated him to the see of Canterbury, consecrating him archbishop next year. King John refused to accept him; it was only after England had been placed under an interdict and John excommunicated and threatened with deposition that he yielded. Langton was acknowledged in July, 1213, and in August he joined the insurgent barons, and acted with them in compelling John to sign Magna Charta. He crowned Henry III, and in 1223 he demanded of him the full execution of the charter. He was the author of a number of theological treatises. He died in 1228.

Language. See *Philology*.

Languedoc (lâṇ-gė-dok), one of the old provinces of Southern France, now forming the departments of Aude, Tarn, Hérault, Lozère, Ardèche and Gard, as well as the arrondissements of Toulouse and Villefranche, in the departments of Haute-Garonne; and the arrondissements of Puy and Yssingeaux, in the department Haute-Loire. As to the name see next article.

Langue d'oc (-dok), the name given to the independent Romance dialect spoken in Provence in the middle ages, from its word for *yes* being *oc*, a form of the Latin *hoc*. It was thus distinguished from the language spoken by the natives of the north of France, which was called *Langue d'oui* or *Langue d'oil*, their affirmative being *oui* or *oil*. The *langue d'oc* was the language of the Troubadours, and is known also as *Provençal*.

Lanier (lan'i-ėr), SIDNEY, poet, born at Macon, Georgia, in 1842; died in 1881. He studied and practiced law, but abandoned it to devote himself to literature. He served as a private in the Confederate army and after 1879 was lecturer on English literature at Johns Hopkins University. His poems, especially his *Centennial Ode*, gave him a wide reputation and showed ample poetic power. He wrote also a number of works in prose, as *The Science of English*

Verse and *The English Novel and Its Development.*

Laniidæ (lan-ī'i-dē), the shrikes, a family of insessorial or perching birds. See *Shrike.*

Lankester (lan'kes-tėr), EDWIN, an English physician and scientist, born in 1814; died in 1874. He was graduated M.D. at Heidelberg in 1839, and held various offices in the London medical schools and museums. He was for long coroner of Middlesex, and contributed largely to magazines and scientific journals.—His son, EDWIN RAY LANKESTER, born in 1847, was educated at Oxford, and appointed professor of zoology and comparative anatomy at University College, London, in 1874. He has published many scientific memoirs, chiefly on palæontology and comparative anatomy.

Lanner (lan'ėr), the *Falco laniarius*, a species of hawk, especially the female of the species, the male being called a *lanneret.* It is a native of Southern Europe, North Africa and Southwest Asia, and was much valued in falconry.

Lannes (làn), JEAN, Duke of Montebello and marshal of France, was born in 1769; mortally wounded at the battle of Essling, in 1809. Originally a dyer, he enlisted into the army in 1792, and served in Spain and Italy, where he attained the rank of brigadier-general. He accompanied Napoleon to Egypt in 1798, gained the victory at Montebello in Italy in 1800, and bore a chief part at Marengo. He had a chief command at Austerlitz, Jena and Friedland (1805-6-7); and in 1808 marched into Spain and captured Saragossa. He was then ordered to Austria, where he rendered brilliant services.

Lansdowne (lans'down), HENRY CHARLES KEITH FITZMAURICE, MARQUIS OF, was born in 1845, and succeeded to the marquisate in 1866. He was a lord of the treasury from 1868 to 1872, and subsequently undersecretary for war and for India. In 1883 he became governor-general of Canada, and at the end of his term (1888) viceroy of India.—WILLIAM PETTY, first marquis, better known as Earl of Shelburne, born in 1737; died in 1805. He began political life in 1763; became prime minister in 1782, but was driven from power by the Fox and North coalition. In 1784 he was made Marquis of Lansdowne.

Lansford, a borough in Carbon County, Pennsylvania, 6 miles N. E. of Tamaqua. It is in a mining region and has coal-breakers, machine shops, etc. Pop. 8321.

Lansing (lan'sing), a city, capital of Michigan, on Grand River, 85 miles N. W. of Detroit. The seat of government was located here in 1847 and it was made a city in 1859. It has a handsome State House, State Library, State Reform School, Agricultural College and School for Blind. It is an important manufacturing center, producing agricultural implements, stoves, automobiles, and many other articles. Pop. 31,229.

Lansingburg, a former village of Rensselaer County, New York, on the east bank of the Hudson, nearly opposite its confluence with the Mohawk. It now forms part of the city of Troy. Its manufactures are extensive.

Lantern. See *Lamp.*

Lantern (lan'tėrn), in architecture, (1) an erection on the top of a dome, on the roof of an apartment, or in similar situations, to give light, to promote ventilation, or to serve as a sort of ornament. (2) A tower which has the whole or a considerable portion of the interior open to view from the ground, and is lighted by an upper tier of windows, such as the towers which are commonly placed at the junction of the cross in a cruciform church; also a light open erection occurring on the top of a tower.

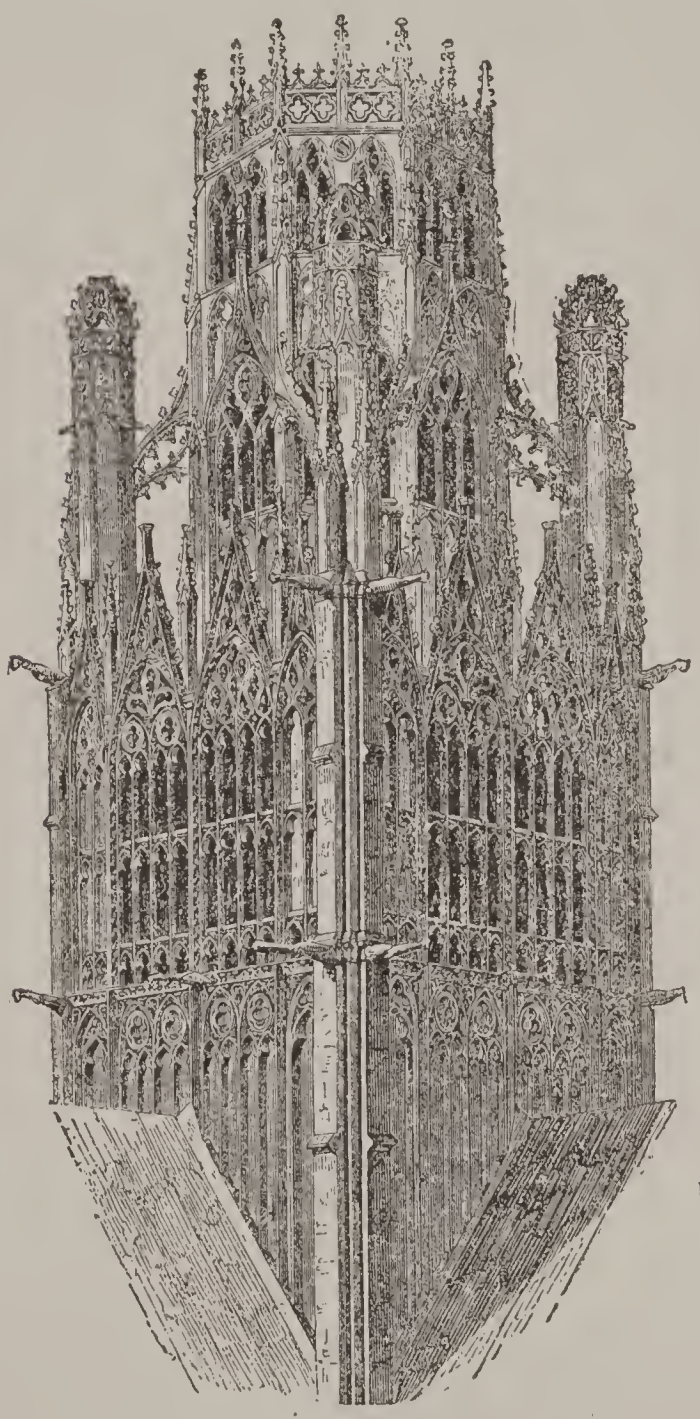
Lantern-flies, insects allied to the cicadas, but forming a family by themselves, the Fulgoridæ. They are remarkable for the prolongation of their forehead into an empty vesicular expansion. The lantern-fly proper (*Fulgŏra lanternaria*) is a native of South America. It is more than 3 inches in length, and 5 across the wings. It has been asserted that it emits a strong light from the inflated expansion of the forehead, but the evidence of this luminosity is more than doubtful. They are in fact reported to fly only during sunlight and not to appear abroad during darkness. A Chinese species has, on equally equivocal testimony, been quite frequently called *F. candelaria.*

Lantha'nium, LAN'THANUM (sym. La, at. wt. 92), a rare metal associated with didymium in the oxide of cerium, and so named from its properties being concealed (Gr. *lanthanein*, to lie hid), as it were, by those of cerium. Lanthanum forms only one series of compounds, such as the oxide, chloride and sulphide.

Lanzarote (lan-sâ-rō'tā), the most northeastern of the Canary Isles; greatest length, 36 miles; mean breadth, 15 miles. Its coast is generally

bold, and the hills in the center rise to an elevation of 2000 feet. The island is of volcanic origin, and one volcano is still active. Pop. 17,546.

Lanzi (län'tsē), Luigi, an Italian archæologist, born in 1732; died in 1810. He entered the order of the



Lantern—St. Owen, Rouen.

Jesuits in 1749, and was professor of the humanities in several colleges. He became assistant director of the gallery at Florence, and devoted his energies to archæological and artistic research. His chief works are a *Treatise on the Etruscan and other Ancient Languages of Italy*, and the *History of Italian Painters*, an esteemed work which has been translated into English by Roscoe.

Laocoon (lā-ok'ō-on), in ancient Greek legend, a priest of Poseidon (Neptune), among the Trojans, who, along with his two sons, was killed by two enormous serpents sent by Apollo. The story has frequently furnished a subject to the poets, but it is chiefly interesting as having served as the subject of one of the most beautiful groups of sculpture in the whole history of ancient art. This was discovered at Rome among the ruins of the palace of Titus in 1506, and is now placed in the vatican. It is supposed to be the group described by Pliny as the work of three sculptors of Rhodes, a father and two sons, Agesander, Polydorus and Athenodorus, but doubts exist as to its date.

Laodicea (la-o-di-sē'a), the ancient name of several places in Asia Minor. One of these, now called *Eski Hissar* (Old Castle), 120 miles E. S. E. of Smyrna, was the site of one of the seven primitive Christian churches of Asia. Another is now known as *Latakia*.

Laon (län; ancient, *Bibrax Suessionum*), a fortified town in France capital of the department Aisne, 74 miles northeast from Paris. It is situated on a height in the midst of a level country, and has interesting old buildings, especially the former cathedral, dating from the twelfth century. Laon was the seat of a bishopric as early as 500 A.D., and was made the capital of his kingdom by Charles the Simple of France about 900. Napoleon Bonaparte was defeated here in 1814. On September 9, 1870, it surrendered to the Germans without a blow being struck. Pop. 9787.

Laos (lä'ōs), a territory in the Indo-China peninsula, surrounded by the Shan States, Anam, Tonquin and the Chinese province of Yun-nan. A large part of it has been a French protectorate since 1893; the remainder is included in Siam. Its extent and the number of its inhabitants are unknown, but they have been estimated at one and a half millions. The country is intersected by mountain ranges and traversed by the Me-kong or Cambodia river, the alluvial valley of which produces abundant sugar, rice, tobacco, etc. Laos exports to the neighboring states a considerable quantity of ivory, gold, silver, precious stones, silk, etc. The inhabitants are reported to be connected with the Burmese in their racial, social, and religious peculiarities. The capital is Chieng-Mai.

Lao-tze (lä'ō-tseh), or Lao-tseu, sometimes also called Lao-

KIUN, a celebrated Chinese philosopher, founder or reformer of one of the most ancient and important religious sects of China, known as the Tao, or sect of reason. Born about the year 600 B.C., we learn that he was historiographer and librarian to a king of the Chow dynasty; that he traveled to the borders of India, where he may have become acquainted with Buddhism; that he met Confucius and reproached him for his pride, vanity and ostentation; that he was persuaded to record his doctrines in a book, which he did in the *Tao-ti-king* or *The Path to Virtue;* that on completing this task he disappeared into the wilderness, and there, it is said, ascended to heaven. According to him, silence and the void produced the Tao, the source of all action and being. Man is composed of two principles, the one material and perishable, the other spiritual and imperishable, from which he emanated, and to which he will return on the subjugation of all the material passions and the pleasures of the senses. Lao-tze's moral code is pure, inculcating charity, benevolence, virtue and the free will, moral agency and responsibility of man. From the insight and deep wisdom of his moral code it has been supposed that Lao-tze had been indebted to western teaching, but there is no clear proof of this. Since the second century of our era the sect has continued to extend over China, etc.

Laparotomy (la-pa-rot'o-mi), a surgical opening of the abdominal cavity by incision. See *Ovariotomy.*

La Paz (lä-päth'), or LA PAZ DE AYACUCHO, a town of Bolivia, capital of a department of the same name, and since 1898 capital of Bolivia. The city is built in amphitheater form, is the seat of a bishopric, and has a cathedral and university. It is a place of considerable wealth and importance. Most of the inhabitants are Aymara Indians, or of mixed race. Pop. 67,235.—The department has an area of 53,777 square miles and a population estimated at 445,616.

La Pérouse (pā-rös), JEAN FRANÇOIS GALAUP, COMTE DE, a French navigator, born in 1741. He entered the naval service at an early age, and during the American war received command of an expedition sent to Hudson Bay, where he destroyed the trading stations of the British. In 1785 he left France in charge of an exploring expedition to the Pacific, and having visited parts of its western and eastern coasts and sundry of its islands, the expedition arrived in Botany Bay in 1788. Here La Pérouse left a letter, in which he declared his intention to proceed to the Isle of France, but nothing more was heard of the unfortunate explorer. Eventually it was discovered that his two vessels, the *Boussole* and *Astrolabe*, had struck on a reef at Mallicolo in the New Hebrides, and that the crews were all either drowned or murdered.

Lapis Lazuli (lā'pis laz'ū-lī), an aluminous mineral of a rich azure-blue color; luster vitreous; fracture uneven; scratches glass; opaque; easily broken; specific gravity, 2.45. The finest specimens are brought from China, Persia and Central Asia, and it is much esteemed for ornamental purposes, especially for inlaid work. From it the pigment called ultramarine is prepared, but this is now also manufactured artificially.

Laplace (lä-pläs), PIERRE SIMON, MARQUIS DE, a celebrated French mathematician and astronomer, born in 1749; died in 1827. At an early age he showed wonderful aptitude in mathematical studies; became professor of mathematics in his native town; subsequently sought fortune in Paris, and there made the acquaintance of d'Alembert. Under his guidance the youth soon signalized himself by discovering the invariability of the mean distances of the planets from the sun. He was appointed examiner of the royal corps of artillery, and at the early age of twenty-four was admitted into the Academy of Sciences. Besides his mathematical work he was associated with Lavoisier in chemical research. During the revolution Laplace was an extreme republican, and in 1799 he was nominated to the ministry of the interior—a position which he filled so badly that he was superseded in six weeks. Receiving the patronage of Bonaparte he was made president of the senate, and in 1806 raised to the dignity of count of the empire. Notwithstanding these favors he deserted the emperor in 1814, voted for the establishment of a provisional government, and was rewarded by the Bourbons with the title of marquis. In 1816 he was named a member of the French Academy. Almost any one of Laplace's original researches is alone sufficient to stamp him as one of the greatest of mathematicians. The discovery of the invariability of the major axes of the planetary orbits, the explanation of the great inequality in the motions of Jupiter and Saturn, the solution of the problem of the acceleration of the mean motion of the moon, the theory of Jupiter's satellites, and other important laws are due to Laplace, including his famous Nebular Theory, or attempt to explain the development of the Solar Svs-

tem. The most important of his works are the *Mécanique Céleste; Système du Monde*, a *resumé* of all modern astronomy; *Théorie analytique des Probabilités; Essai sur les Probabilités.*

Lapland (lap'land), the land of the Lapps, an extensive territory in the north of Europe, stretching between lat. 64° and 71° N., and from the shores of Norway east to those of the White Sea; area about 130,000 square miles, of which more than half belongs to Russia, and the remainder is shared, in nearly equal proportions, between Sweden and Norway. The climate for nine months of a dark winter is excessively cold; spring and autumn are short; and the summer of two months, when the sun never sets, is extremely hot. Vegetation is scanty except in the form of birch, pine, fir and the abundant mosses which supply food for the herds of reindeer. The Lapps belong to the Finnic branch of the Turanian family. They are a small, muscular, large-headed race, with high cheek-bones, wide mouth, flat nose, and scanty beard. Many of them are nomadic, owing their subsistence to their herds of reindeer; others support themselves by fishing. They are generally ignorant, simple hearted and hospitable. The Norwegian Lapps belong to the Lutheran and the Russian Lapps to the Greek Church. Their numbers do not exceed 27,000.

La Plata. See *Argentine Republic.*

La Plata (lä-plä'ta), a city of the Argentine Republic, situated on the shores of a fine natural harbor called Ensenada, in the La Plata estuary, 40 miles below the city of Buenos Ayres, and connected with it by rail. Although recently founded as the capital of Buenos Ayres province, it has already become an important commercial center, having a palace for the legislative assembly, a cathedral, law courts, theater, public park, etc. Pop. estimated at 84,000.

Laporte (la-pōrt'), a city, capital of Laporte County, Indiana, 50 miles southeast of Chicago. The neighborhood has become a favorite resort of summer visitors on account of its beautiful lakes. There are manufactures of carriages, threshers, engines, woolen goods, etc. Pop. 10,525.

Lappenberg (lap'en-berg), JOHANN MARTIN, a German historian, was born at Hamburg in 1794; died in 1865. Sent by his father to study medicine at Edinburgh, he gave his attention to history and political science, and spent some time in London studying the English constitution. Returning to Germany, he continued his studies in Berlin and Göttingen. He was made archivist of Hamburg in 1823, a post which he held till 1863. He became a member of the senate in 1848, and was appointed plenipotentiary to Frankfort in 1850. His most remarkable work is his *History of England under the Anglo-Saxon and Norman Kings.*

Lapwing (lap'wing), a bird belonging to the family of plovers and order of Grallatores. The common lapwing (*Vanellus cristātus*), a well-known European bird, is about the size

Lapwing (*Vanellus cristātus*).

of a pigeon; it is often called the *peewit* from its particular cry. In the breeding season these birds disperse themselves over the interior of the country, where they lay their eggs in a small depression of the ground, in cultivated fields, moors, etc. In winter they retire to the seacoast. Their eggs are esteemed a great luxury, and great numbers are annually sent to the London markets.

Laraiche (lå-rāsh'), or EL ARAISH, a seaport of Morocco. Pop. about 6000.

Laramie (lar'a-mē), a city, capital of Albany County, Wyoming, 57 miles N. W. of Cheyenne. It is 7513 feet above sea level and is surrounded by beautiful mountain scenery. It is the seat of Wyoming University, has large railway and machine shops, large rolling mill, etc., and is an important supply point. Near by is a fish hatchery. Pop. 8237.

Laramie Mountains, a range of the Western United States, which extends through Wyoming and Colorado and bounds the Laramie Plains on the east and northeast. The highest point is Laramie Peak, 10,000 feet high.

Larboard (lår'bord), the left side of a ship looking towards the stem, now called the *port* side.

Larceny (lår'se-ni) is the fraudulent appropriation of the personal property of another person with-

out that person's consent. To constitute this crime the removal of the goods to any distance is not necessary, but it requires to be shown that the article has completely passed, for however short a time, into possession of the criminal. Concerning the kinds of things the appropriation of which is larceny, the common law restricted them to personal property as distinguished from real estate, but this distinction has been largely abolished by recent statutes. Larceny was formerly divided into two kinds, grand and petty, which was determined by the value of the thing stolen, but the distinction is now abolished in almost all the States. The penalty varies in the different States; but, generally, in ordinary cases, a person convicted of larceny is liable to imprisonment at hard labor for not more than two years; on a second conviction not more than ten, nor less than four.

Larch, the common name of trees belonging to the genus *Larix*, nat. order Coniferæ, having deciduous leaves, small, erect, oval, blunt-pointed cones, and irregularly margined scales. This genus is now usually united to *Abies*. The common larch (*L. Europæa*), though a native of Italy, Switzerland and South Germany, is one of the most frequently cultivated trees in Britain, and is remarkable for the elegance of its conical growth and the durability of its wood, which is used for a variety of purposes. Besides the common larch, there are the Russian larch, the red larch and the black larch (*L. Americana*), a native of America. The last species has also the name of *hackmatack* or *tamarack*.

Lard, is obtained from the fat of swine when it is heated to boiling point and then strained. It is chiefly composed of oleine and stearine, and is now largely used in the manufacture of candles, soap, pomades, etc. The best quality is found in the fat which surrounds the kidneys, and this is employed in pharmacy for the preparation of unguents. When subjected to pressure the oleine is liberated, forming lard-oil, which is much used as a lubricant for machinery.

Lardizabalaceæ (lar-di-zab-a-lā'-se-ē), a nat. order of plants, natives of South America and China, now regarded as a tribe of the Berberidaceæ or barberries.

Lardner (lård'ner), Dionysius, popular writer on scientific subjects, born at Dublin in 1793; died in 1859. Educated at Trinity College, he devoted his attention to science, contributed to the leading cyclopædias, and in 1827 was appointed to the chair of natural philosophy and astronomy in the University of London. Having been convicted in the law courts of immorality, he withdrew to America, but returned in 1845 and resided in Paris.

Laredo (lå-rē'dō), a city, capital of Webb County, Texas, on the Rio Grande, 153 miles S. W. of San Antonio. It is a railroad center and largely exports wool and cattle, while coal and iron are extensively worked. There are car and machine shops and brick kilns, also concentrating and sampling works. It has a large shipping trade in wool, bricks and onions. Pop. 14,855.

Lares (lā'rēz), a class of tutelary spirits or deities (domestic and public) among the ancient Romans. All the household lares were headed by the *lar familiaris*, who was revered as the founder of the family. In the mansions of the rich the images of the lares had their separate apartment. When the family took their meals some portion was offered to the lares, and on festive occasions they were adorned with wreaths.

Largo (lår'gō), an Italian word in music meaning slowly. *Largo* is one degree quicker than *grave*, and two degrees quicker than *adagio*. *Larghetto* is the diminutive of *largo*.

Largs (lärgz), a seaside resort in Scotland, county of Ayr, on the Firth of Clyde. In 1263 Alexander III defeated the Norwegians under Hako in the vicinity. Pop. 3246.

Laridæ (lår'i-dē), the family of natatorial birds popularly known as the sea-gulls, sea-mews, or gulls, and of which the genus *Larus* is the type. See *Gulls*.

Larissa (lä'-ris-sa), a town of Northern Greece, on the river Peneus (now Salambria), the capital of Thessaly. It is the seat of an archbishopric, with a population in 1907 of 18,001. It was the rendezvous place of Julius Cæsar's army before the battle of Pharsalia.

Lark, the common name of birds of the genus *Alauda*, family Alaudidæ. They are characterized by a short, strong bill; nostrils covered with feathers; forked tongue; long, straight hind-claw; and the power to raise the feathers on the back part of the head in the form of a crest. Their distribution throughout the Old World is general, but there is no species native to America, the shore or horned lark belonging to a different genus (*Otocorys*). They are terrestrial in habit, feed upon worms, larvæ, etc., nest upon the ground, and bring forth a brood twice in the year. The best known is the sky-lark (*A. arvensis*), which is celebrated for the prolonged beauty of

its song. The wood-lark (*A. arborea*) is less common than the sky-lark, and is known by its smaller size and less distinct colors. It perches upon trees, and is found chiefly in fields near the borders of woods. It sings during the night, and on this account has been mistaken for the nightingale.

Lark-bunting, a common fringilline bird (*Calamospiza bicolor*) of the Great Plains of the United States. It resembles the bobolink in its great seasonal changes of plumage. It has an entertaining song, like that of the yellow-breasted chat, which it also resembles in singing while in flight.

Lark-finch, or lark-sparrow, a familiar brownish-gray sparrow (*Choudestes gramniaca*), of the prairie and plain regions of the United States. It breeds on the ground and has a pleasant song.

Larkhall (lark'hạl), a town of Scotland, in Lanarkshire, 3½ miles southeast of Hamilton. The inhabitants are employed in coal mines, bleachworks, etc. Pop. 11,879.

Lárkhána (lär-kä'nu), a town of India, in Sikárpur district, Sind, Bombay Presidency, is situated on a fertile tract of land on the south side of the Ghár Canal. Pop. 14,543.

Larkspur (lark'spur; *Delphinium*), sometimes called lark's-heel, a genus of plants of the order Ranunculaceæ, distinguished by its petaloid calyx, the superior sepal of which terminates in a long spur. The Upright Larkspur (*D. ajacis*) and the Branching Larkspur (*D. consolida*) are well-known garden flowers.

Larksville, a borough in Luzerne County, Pennsylvania, 3 miles W. by N. of Wilkes-Barre. In a coal-mining region. Pop. 9288.

Larnaca (lär'nâ-kâ), or LAR'NICA (ancient *Citium*), a town on the south coast of the island of Cyprus, on a marshy plain about 1 mile from the shore. It is the chief commercial center in the island. Since the British occupation in 1878 the place has become of more importance. Pop. 7964.

Larne (lärn), a seaport of Ireland, County Antrim, 18 miles north by east of Belfast. The bleaching of linen is extensively carried on, and there are large flour-mills. The harbor, about a mile below the town, is one of the best in the east coast. Larne is much resorted to during summer as a watering-place. Pop. 4716.

La Rochefoucauld (rō sh-fö-kō), FRANÇOIS, DUC DE, PRINCE DE MARSILLAC, a distinguished courtier and man of letters under Louis XIV, was born at Paris in 1613; died in 1680. He was a distinguished military officer attending the court of Louis XIII, but being suspected by Richelieu of favoring the party of Queen Anne of Austria he was exiled to Blois. Returning when the cardinal died, but not receiving the reward which he anticipated, he took the side of the Parliament in the Civil war, and was wounded in the Faubourg Saint-Antoine of Paris. Abandoning his military career, he began to cultivate literature and a social intercourse with Boileau, Racine, Molière, Madame de Sévigné and Madame de la Fayette. His *Mémoires*, published in 1662, and his *Réflexions ou Sentences et Maximes Morales*, published anonymously in 1665, were the fruits of his literary activity. The latter work, for its great brilliancy of style, is still considered a French classic.

La Rochejaquelein (rō sh-zhàk-laṇ), HENRI DU VERGIER, COMTE DE, a celebrated chief of the Vendean royalists, was born in 1772. During the French Revolution he put himself at the head of the peasants of La Vendée, and gained sixteen victories in ten months. At the age of twenty-two he was shot by a republican soldier in the battle of Nouaillé, March, 1794. He was one of the most sincere and courageous of the French royalists.

La Rochelle. See *Rochelle.*

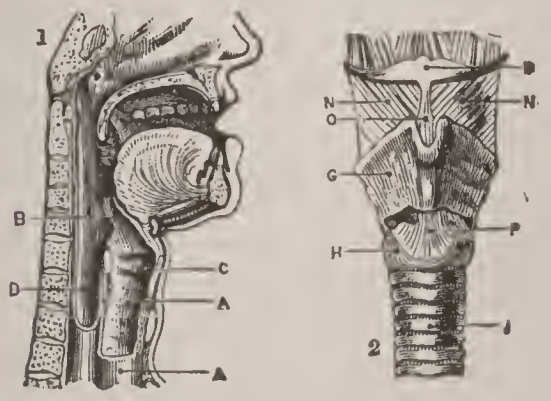
Larva (lar'va), the term applied in natural history to the first stage in the metamorphosis of insects, and certain other of the lower invertebrates. In insects it is equivalent to the grub or caterpillar stage. Many of the crustacea, as crabs and barnacles, and even vertebrata, as the frogs and newts, pass through larval forms. The larval crab was for long described as a distinct crustacean with the name of *Zoëa.* See *Metamorphosis.*

Laryngitis (lâr-in-jī'tis), inflammation of the mucous membrane lining the larynx. It may be acute or chronic. The first usually arises from a cold.

Laryngoscope (la-ring'a-skōp), a contrivance for examining the larynx and commencement of the trachea. It consists of a plane mirror introduced into the mouth, and placed at such an angle that the light thrown on it from a concave reflector, in the center of which is an aperture, is made to illuminate the larynx, the image of which is again reflected through the aperture in the reflector to the eye of the observer.

Laryngoscopy (lå r-i n-gos'cō-pi), the science and art of examining a larynx by the laryngoscope (see above) or through a tube (Kirstein's autoscope).

Larynx (lår-inkz), the organ by aid of which the voice is produced, situated at the upper part of the trachea or windpipe. The larynx is formed mainly of two pieces of cartilage, called the *thyroid* and the *cricoid*, one placed above the other. The thyroid is formed of two extended wings meeting at the middle line in front in a ridge; above



Larynx internally (1) and externally (2).

and from the sides two horns project upwards, which are connected by bands to the hyoid bone, from which the larynx is suspended. The thyroid cartilage rests and is movable upon the cricoid, moving backwards or forwards, but not from side to side. The cricoid cartilage is shaped like a signet-ring (Greek *krikos*, a ring), the narrow part of the ring being in front. The cricoid carries, perched on its upper edge behind, the *arytenoid* cartilages, which are of great importance in the production of the voice. These various cartilages form a framework upon which muscles and mucous membranes are disposed. The mucous membrane which lines the larynx is thrown into various folds. These folds are called the *true* vocal cords, and by their movements the voice is produced. They are called *true*, as distinct from the *false* vocal cords which are above them, but take no part in producing the voice. The true vocal cords projecting towards the middle form a chink, which is called the glottis. By the contraction of various muscles this chink can be so brought together that the air forced through it throws the edges of the membrane into vibration and so produces sounds. Variations in the form of the chink will affect changes in the sound. Thus the production of voice is the same as in musical instruments, the arrangements in the larynx being such as to produce (1) the vibratory sounds, (2) to regulate the sound, (3) to vary the pitch, and (4) to determine the quality of the sound. The rapid, delicate, muscular movements involved are produced by nervous stimuli reaching the muscles from the brain. Thus the voice is produced in the larynx, and is modified by the rest of the respiratory passages. (See *Voice*.) In the act of swallowing, the glottis is covered by a cartilaginous plate called the *epiglottis*. In the accompanying cut, fig. 1 shows C the larynx internally, B being the epiglottis situated above the glottis or entrance to the larynx, A A the trachea, and D the œsophagus or gullet. In fig. 2 J is the trachea, B the hyoid bone, N N the thyro-hyoid membrane, O the thyro-hyoid ligament, G the thyroid cartilage, H the cricoid cartilage, P the crico-thyroid ligament.

La Salle (lå-sal'), a city of La Salle County, Illinois, on the north bank of the Illinois River, 99 miles southwest of Chicago. Steamboats ascend the river to this place, which is the terminus of the Illinois and Michigan Canal. It has extensive clock factories, manufactures of Portland cement and pressed bricks, and zinc smelting works and rolling mills. There is a good supply of bituminous coal in the neighborhood. Pop. 11,537.

La Salle, Robert Cavalier de, a famous French explorer, born at Rouen in 1643, emigrated to America in 1667, and made long fur-trading excursions among the native tribes. In 1675, appointed governor of Fort Frontenac, he built a vessel on Lake Erie, sailed through Lakes Huron and Michigan, and in 1682 descended the Mississippi in canoes to its mouth. In 1684 he attempted to found a French colony at the mouth of the Mississippi, but missed the location and landed in Texas. Attempting to proceed to Canada overland he was murdered in 1687 by mutinous companions. He was one of the most adventurous and daring of the explorers of America.

Las Casas (lås käs), Bartolomé de, a Spanish prelate, known as the 'Apostle of the Indians,' born in 1474; died in 1556. He accompanied Columbus to Hispaniola in 1498, and on the conquest of Cuba received charge as priest there, and distinguished himself for his humane treatment of the natives. In his zeal for the Indians he returned to Spain several times and obtained decrees in their favor, which, however, were of little avail. In the cause of religion he visited various parts of the New World, including Mexico, Guatemala, Peru, etc. In 1542 he wrote his famous *Brevissima*

Relacion de la Destruction de las Indias. His untiring labors were productive of good to the natives, yet it is a singular fact that he proposed to purchase negroes in order to supply the Cuban planters with African laborers instead of the Indians. He was made bishop of Chiapas in 1544, but resigned this dignity in 1547, his humane efforts being fustrated. He died at Madrid.

Las Cases (läs käs), EMMANUEL AUGUSTE DIEUDONNÉ MARIN JOSEPH, COMTE DE, a French writer, born in 1766; died in 1842. Employed before the revolution as a lieutenant of marines, he afterwards retired to England, where he supported himself by private teaching. Returning to France, he employed himself upon his *Atlas Historique*, published under the name of Le Sage. Coming under the notice of Napoleon, he was by him made baron and minister of state. After Waterloo he shared Napoleon's imprisonment in St. Helena, where the emperor dictated part of his *Memoirs* to Las Cases, and took lessons from him in English. Removed to the Cape of Good Hope from St. Helena for sending out a secret letter, he was permitted to return to France after Napoleon's death, where he published the *Mémorial de St. Hélène* in his *Atlas Historique.*

Laserpitium (lā-ser-pi'shi-um), a genus of plants, nat. order Umbelliferæ, containing about twenty species, natives of Europe, North Africa and West Asia. They are tall, perennial, herbaceous plants, with pinnate leaves and compound, many-rayed umbels of yellowish or white flowers, the fruit with eight wing-like appendages. Some of them are natives of mountainous districts of Europe, and have tonic and other medicinal properties.

Lasher. See *Fatherlasher.*

Lashkar. See *Gwalior.*

Lassa (läs'sȧ), or LHASSA, the capital of Tibet, situated on the Kitchu, a tributary of the Brahmaputra. All the public edifices worthy of notice are connected with the Buddhist religion, Lassa being the great center of Buddhism, and being greatly resorted to from China, Turkestan, Nepaul, etc., as a school of philosophy and Buddhism. About 1½ miles northwest from the city is the Bottala or Buddha-la, the residence of the Dalai (Grand) Lama, the ecclesiastical sovereign of Tibet, and supreme pontiff of the vast regions forming Central, Eastern, and Southeastern Asia. A triple-peaked hill here rises abruptly out of the plain to the height of 367 feet; it is covered with convents and cells of monks, and in the center is the palace of the Dalai Lama, a fine edifice, four stories in height, with a vast number of apartments and a large dome. It has recently been occupied by Chinese troops, and the Lama, who sought the sovereignty of Tibet, is in exile. Lassa is the principal emporium of Tibet; silk stuffs, tea, and other articles being here exchanged for Tibetan, Indian and European goods. Pop. estimated at 10,000.

Lassalle (lȧs'sȧl-lė), FERDINAND, a notable German socialist, born at Breslau in 1825, of Jewish parents; studied at Berlin University; first made himself known as a leader during the democratic troubles of 1848, and was imprisoned for a year. In 1861 he published his *System of Acquired Rights.* Thereafter he proceeded to organize the working classes, which caused the government to accuse him of sedition, and he was imprisoned for four months. In May, 1863, he founded a Labor Union, and began that socialist propaganda which has since become so widespread in Germany. In the summer of 1864 he sought rest in Switzerland, and was there killed in a duel occasioned by a love affair. His best-known treatise is the famous *Program for the Working Classes.*

Lasso (las'ō), a contrivance used in Spanish America and the Western United States, consisting of a long rope of plaited raw hide, at one end of which is a small metal ring. By means of this ring a noose is readily formed, and the lasso, or lariat, is then used for catching wild cattle, the rope being cast over the animal's head or leg while the hunter is in full gallop.

Lasso, ORLANDO DI (*Orlandus Lassus*), one of the great musicians of the sixteenth century, born at Mons in Hainaut in 1520 or 1530; died in 1594. He traveled in England and France, and was appointed chapel-master at Munich. A collection of his works was published at Munich (1604) under the name of *Magnum Opus Musicum.*

Lastrea (las-trē'a), a genus of ferns containing the male-fern, etc.

Lât, a name given to pillars common to all the styles of Indian architecture. With the Buddhists they bore inscriptions on their shafts, with emblems or animals on their capitals. They are among the most original and often the most elegant productions of ancient Indian architecture.

Latakia (lat-a-kē'a), or LADIKI'A (anciently *Laodicea ad Marc*), a seaport in Syria, 70 miles north

of Tripoli, on the Mediterranean. The harbor is well sheltered, though shallow, and there is a considerable trade in silk and cotton, while Latakia tobacco is famous throughout Europe. Pop. about 22,000.

Lateen Sail (la-tēn′), is a triangular sail used in xebecs, feluccas, etc., in the Mediterranean, and in the dahabiehs of the Nile. It is extended by a *lateen* yard, which is slung across a mast so as to make an angle of about 45 degrees with it, the lower portion of the yard being about a third of the whole.

Latent Heat, that portion of heat which exists in any substance without producing an effect upon another or upon the thermometer; termed also *insensible* as distinct from *sensible heat.* It becomes sensible during the conversion of vapors into liquids, and of liquids into solids; and on the other hand a portion of sensible heat disappears or becomes *latent* when a body changes its form from the solid to the liquid, or from the liquid to the gaseous state.

Lateran (lat′er-an), one of the historic churches at Rome, built originally by Constantine the Great, and dedicated to St. John of Lateran. It is the episcopal church of the pope, and the principal church of Rome. It has a palace and other buildings annexed to it. Every newly-elected pope takes solemn possession of the church, and from its balcony the pope bestows his blessing on the people. The site on which the buildings of the Lateran stand originally belonged to a person named Plautius Lateranus, who was put to death by Nero; hence the name.

Lateran Councils, councils of the Roman Catholic Church, so called because they were held in the Lateran Church in Rome. There were eleven such councils, five of which were ecumenical, the most important being that convened by Alexander III, March 2, 1179, which established the form under which the popes are elected, and that called by Innocent III in November, 1215, which ordered the Crusade, condemned the Waldenses, and called the mystery of the eucharist transubstantiation.

Latham (lā′tham), Robert Gordon, an English scholar, born in 1812; died in 1888. He was educated at Eton and Cambridge; was graduated in 1832, and resided for some time in Denmark and Norway. He adopted the profession of medicine, and became physician to Middlesex Hospital, having been previously appointed to the chair of English language and literature in University College. His name is chiefly associated with researches in philology and ethnology. His best-known works are: *History of the English Language; Handbook of the English Language; Natural History of Man; The Varieties of Man; Descriptive Ethnology; The Ethnology of Europe;* and a new edition of *Todd's Johnson's Dictionary.*

Lathe (lāth), a machine for turning and polishing flat, round, cylindrical, oval, and every intermediate form of body in wood, ivory, metals, etc., the object worked on receiving a rotary motion; it is also used in glass-cutting and earthenware manufacture. It may be turned by the hand, the foot, steam-power, water, etc. A *duplex lathe* is one which works on two turning tools at once; *Blanchard's lathe* is one for turning objects of an irregular form, as lasts, gunstocks, etc. A *throw-lathe* is one in which the mechanic drives the lathe with one hand, holding the cutting tool with the other. The term is also applied to the batten or lay of a loom in which the reed is fixed, and by the movements of which the weft-threads are laid parallel to each other, shot after shot, in the process of weaving.

Lathyrus (lath′e-rus), a large genus of plants, natives of the northern hemisphere and of South America, nat. order Leguminosæ. Many are ornamental, such as the sweet-pea (*L. odorātus*) and the everlasting-pea (*L. latifolius*), and some useful as agricultural plants.

Latimer (lat′i-mėr), Hugh, an English prelate, reformer and martyr, born about 1490. He entered Cambridge University about 1505, and became M.A. in 1514. He took holy orders, and by and by began to preach Protestant doctrine, which led to vigorous opposition. He was made chaplain to Henry VIII in 1530, and during the ascendency of Anne Boleyn in 1535 he was appointed bishop of Worcester. In 1538 he resigned his bishopric, not being able to accept the Six Articles, and was put in prison, but on the accession of Edward VI he was released and became highly popular at court. This continued until Mary ascended the throne, when Latimer was cited to appear, along with Cranmer and Ridley, before a council at Oxford, and condemned. After much delay and a second trial, Latimer and Ridley were burned at the stake, Oct. 16, 1555. His preaching was popular in his own time for its pith, simplicity and quaintness.

Latin Church, the Roman Catholic Church.

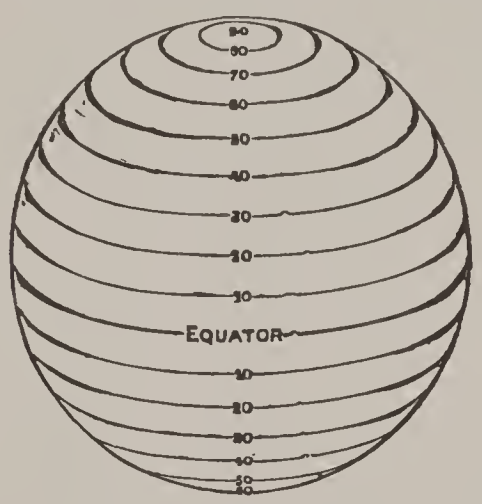
Latin Empire. See *Byzantine Empire.*

Latin Language and Literature. See *Rome.*

Latins (la'tins; *Latini*), the ancient inhabitants of Latium, in Italy. In very early times the Latins formed a league of thirty cities, of which the town of Alba Longa, said to have been built by Ascanius, the son of Æneas, became the head. Rome was originally a colony of Alba, and thus the language of the Romans is known as the Latin language.

Lati'nus. See *Æneas.*

Latitude (la't'i-tūd), in geography, the distance of any place on the globe north or south of the equator



Parallels of Latitude.

measured on its meridian. It is called *north* or *south* according as the place is on the north or south of the equator. The highest or greatest latitude is 90°, that is, at the poles; the lowest or smallest 0°, at the equator, between which and the poles any number of parallel circles called *parallels of latitude* may be supposed to be drawn. One method of finding the latitude of a place is by measuring the altitude of the pole-star. When the latitude and longitude of a place are given its position on a map is easily found. See *Longitude.*

Latitudinarians (la t-i-tū-di-nā'ri-ans), a term applied to certain broad church English divines of Charles II's time. They endeavored to allay the contests that prevailed between the Episcopalians on the one hand, and the Presbyterians and Independents on the other, and also between Arminians and Calvinists. At present it generally denotes one who commends or sanctions deviations from the strict principles of orthodoxy.

Latium (lā'shi-um), the ancient name applied to a district of Central Italy on the Tyrrhenian Sea, extending between Etruria and Campania, and inhabited by the Latins, Volsci, Æqui, etc.

Latona (lå-tō'na; by the Greeks called *Lētō*), in Greek mythology, the mother of Apollo and Artemis. Latona is represented as a mild, benevolent goddess, in a sea-green dress. She was worshipped chiefly in Lycia, Delos, Athens, and other cities of Greece.

Latour D'Auvergne (lå-tör dō-var-ny), Théophile Malo de, a French soldier, born in 1743. Entering the military service in 1767, he became aide-de-camp to the Duke of Crillon, and distinguished himself at the siege of Mahon. When the revolution began he was a captain of grenadiers, refused higher positions, and was named *First Grenadier of France* by Napoleon. He commanded a corps of 8000 men, which was known as the *infernal column.* In 1799 he fought under Masséna in Switzerland, and fell at Neuburg, June 27, 1800.

La Trappe (lå-trap), a Cistercian abbey of Northern France, situated in a narrow valley of Normandy, 30 miles northeast of Alençon. Founded in 1140, it had become in the seventeenth century a haunt of licentious monks known as 'the bandits of La Trappe.' In the seventeenth century, however, the abbot Armand Jean le Bouthelier de Rancé instituted a vigorous reform, and caused the monks to adopt a life of severe asceticism. The austere Trappists prayed eleven times daily, spoke no word to each other except the salutation of *Memento mori,* fed upon fruit and pulse, and every evening dug their own graves. At the revolution the Trappists were obliged to leave France, but at the restoration they returned to their old homes, though expulsions took place again in 1880. La Trappe had hitherto been head monastery of the order, and they have also establishments in various parts of Europe, and in America. The professed brothers wear a dark-colored frock, cloak and hood, which covers the whole face. A female order of Trappistines was founded by Louisa, Princess of Condé.

Latreille (lå-trā-yé), Pierre André, a French zoologist, born in 1762; died in 1833. He was professor of entomology in the Paris museum, and a member of the Academy of Sciences. His writings, which are very numerous, include among others natural histories of salamanders, apes, reptiles, etc., the *Natural Families of the Animal Kingdom,*

Genera of Crustacea and Insects, and a *Course of Entomology*.

Latria. See *Dulia*.

Latrobe (la-trōb'), a borough in Westmoreland County, Pennsylvania, 41 miles E. S. E. of Pittsburgh. It is in a coal-mining district and has numerous large collieries and coke furnaces, also steel, glass, paper and lumber mills. Pop. 8777.

Latrobe (la'trob), BENJAMIN HENRY, born in England in 1763; died in the United States in 1820. He emigrated to America in 1795, was employed as engineer by the State of Virginia, and was architect of the United States Bank in Philadelphia and the first Hall of Representatives in Washington. —His son, JOHN HAZLEHURST (1803-91), was active in forming the colony of Liberia, originated the park system of Baltimore, and was the author of numerous works of fiction, travel, biography, etc.

Latten (lat'en), a fine kind of brass or bronze anciently used for crosses and candlesticks, brasses of sepulchral monuments, etc. That employed by English workmen used to be imported from Germany and the Netherlands, the finest kind being known as Cologne plate. Latteners formed one of the recognized crafts of the city of London. In some localities the term is still applied to plate-tin.

Lattice-girder (lat'is), a girder of which the web consists of diagonal pieces arranged like lattice-work. Lattice-bridge is the name given when the cross-framing is made to resemble lattice-work.

Lattice-leaf, LATTICE-PLANT, a very remarkable aquatic plant of Madagascar (*Ouvirandra fenestrālis*), by some referred to the nat. order Juncaginaceæ, by others to the Naiadaceæ, and noteworthy for the structure of its leaves. The blade resembles lattice-work or open needlework, the longitudinal ribs being crossed by tendrils, and the interstices between them open.

Lattice Plant (*Ouvirandra fenestrālis*).

Lauban (lou'bàn), a town of Prussia, province of Silesia, on the Queis, 40 miles W. S. W. Liegnitz. It has manufactures of woolen and linen cloth, yarn, etc. Pop. 14,624.

Laud (lạd), WILLIAM, Archbishop of Canterbury in the reign of Charles I, was born at Reading in Berkshire in 1573. He was educated at St. John's College, Oxford; took priest's orders in 1601; was made chaplain to Neile, bishop of Rochester, in 1608; became president of his college and king's chaplain, and in 1617 accompanied James I to Scotland, where he attempted to enforce Episcopacy, with no success. After the accession of Charles I Laud was translated to the see of Bath and Wells, and in 1628 to that of London, while his influence seemed to increase. In 1630 he was elected chancellor of the University of Oxford, which he enriched with a valuable collection of manuscripts, establishing also a professorship of Arabic. In 1633 he was promoted to the see of Canterbury. In 1634 he instituted rigorous proceedings against all who would not conform to the Church of England. By means of spies he hunted out the Puritans, and sought to extinguish all forms of dissent by means of fines, imprisonment and exile. He prosecuted Prynne, Burton and Bastwick for libel, and to him is attributed the severe sentences which they received. When the Long Parliament met (1640) the archbishop was impeached for high treason at the bar of the House of Lords by Denzil Holles and committed to the Tower. After three years he was brought to trial, but the lords deferred giving judgment. The House of Commons, however, passed a bill of attainder (January, 1644), declared him guilty of high treason, and condemned him to death. Accordingly he met his end on the scaffold at Tower Hill with great firmness. An edition of his works was published by Parker (Oxford, 1857-60).

Laudanum (lạ'da-num), tincture of opium, a 10 per cent. alcoholic solution. See *Opium*.

Lauder (lạ'der), SIR THOMAS DICK, a Scottish writer, born in 1784; died in 1848. In early life he entered the army, but quitted it in favor of science and literature. He contributed papers to the Edinburgh Royal Society, and in 1817 wrote a tale called *Simon Roy*, which was attributed to the author of *Waverley*. He then tried historical romance in *Lochandhu* and the *Wolf of Badenoch*. In addition to these works are his *Account of the Moray Floods in 1829; Highland Rambles and Long Tales*

to Shorten the Way; editions of *Gilpin's Forest Scenery,* and *Sir Uvedale Price on the Picturesque;* a *Tour Round the Coasts of Scotland;* and the *Queen's Visit to Scotland in 1842.*

Lauderdale (lą'der-dāl), JOHN MAITLAND, DUKE OF, born at Lethington, in Scotland, in 1616; died in 1682. He entered public life as a zealous Presbyterian, and was a party to the delivery of Charles I to the English army at Newcastle. Subsequently, he secretly undertook to raise an army in favor of the king, and tried to induce the Prince of Wales to accept the command, but without success. When in 1650 Charles II embarked for Scotland, he was accompanied by Lauderdale, who was taken prisoner at the battle of Worcester, and was not set at liberty till the Restoration in 1660. He received great favor from the restored king, and the government of Scotland was almost entirely placed in his hands. This power he used with unscrupulous rigor in his efforts to force Episcopacy upon his former Presbyterian friends. As a reward for his zeal and subserviency he was created Duke of Lauderdale (1672) and raised to the English peerage as Viscount Petersham and Earl of Guildford (1674), being later one of the junta known as the Cabal. As a result of his tyrannical conduct an address was presented to the House of Commons praying that he might be removed from all his offices. This was granted, and the disgraced duke died in a few months afterwards.

Lauenburg (lö-en-börg'), or SAXE-LAUENBURG, formerly a duchy of Denmark, but ceded to Prussia in 1864.

Laughing-gas (laf'ing), nitrous oxide, or nitrogen monoxide, or protoxide of nitrogen; so called because, when inhaled, it usually produces exhilaration. See *Nitrogen.*

Laughing Jackass, or GIANT KINGFISHER (*Dacēlo gigas*), a bird allied to the kingfisher, deriving its former title from the singularly strange character of its cry. It is an inhabitant of Australia, being found chiefly in the southeastern portion of that country. It makes no nest, but deposits its eggs in the decayed hollow of a gum-tree. In length about 18 inches, it has a dark-brown crest, its back and upper surface is olive-brown, wings brown-black, and the breast and under portions white, crossed by faint bars of pale brown. The tail is longish, with a rounded extremity, tipped with white; its color is a rich chestnut, with deep black bars.

Laughter (laf'tėr), the outward expression of a certain emotion or excited condition of the nervous system, manifested chiefly in certain convulsive and partly involuntary actions of

Laughing Jackass (*Dacēlo gigas*).

the muscles of respiration, by means of which the air, being expelled from the chest in a series of jerks, produces a succession of short abrupt sounds; certain movements of the muscles of the face, and often of other parts of the body also taking place. Laughter is generally excited by things which are of a ridiculous or ludicrous nature, the ultimate cause being usually attributed to the perception of some incongruity, though mere incongruity is not always sufficient. It may also be caused, especially in the young, by tickling; it also accompanies hysteria, and sometimes extreme grief.

Launce (lăns), a name common to two species of fishes, otherwise called sand-eels. They have their name from their lance-like form. See *Sand-eel.*

Launceston (läns'ton), a town of England, county of Cornwall, 19 miles north by west of Plymouth. Its chief interest is in its antiquity, it having an interesting Gothic church and ruins of an old Norman castle and an Augustinian priory. Pop. (1911) 4117.

Launceston, the second town of Tasmania, by rail 120 miles north of Hobart, at the confluence of the North and South Esk rivers with the Tamar, which is navigable up to the town from the sea at Port Dalrymple, a distance of 40 miles. Among the buildings are a government house, town hall, military barracks, jail and courthouse. There are also public schools, banks, post-office and several newspaper establish-

ments. It has an important trade with South Australia and Tasmania. Pop. 21,180.

Lauraceæ (lą-ra′se-ē), the laurel family, a nat. order of apetalous exogens, consisting entirely of trees and shrubs inhabiting the warmer parts of the world, and in most cases aromatic. Cinnamon, cassia, sassafras and camphor are products of the order. The best-known species is the *Laurus nobilis*, laurel or sweet-bay.

Laureate (lą′re-āt), Poet, a designation first applied to poets who were honored by the gift of a laurel wreath. It is now the name of an official connected with the royal household of Great Britain, the patent for which appears to have been granted by Charles I, 1630, although Ben Jonson and others are said to have held the title previously. It was the chief duty of the laureate to furnish an ode on the birthday of the king or upon the occasion of a national victory, the emolument attached to the office being £100 a year with a tierce of canary. Since the reign of George III there have been no special duties connected with the office. From the time of Charles II the following poets have in succession held the office of laureate: John Dryden, Nahum Tate, Nicholas Rowe, Lawrence Eusden, Colley Cibber, William Whitehead, Thomas Warton, Henry James Pye, Robert Southey, William Wordsworth, Alfred Tennyson and Alfred Austin (1896).

Laurel (lor′el), a plant belonging to the genus *Laurus*, nat. order Lauraceæ, to which it gives the name. The sweet-bay or laurel (*Laurus nobilis*) is a native of the north of Africa and south of Europe, and is cultivated in gardens not only on account of its elegant appearance, but also for the aromatic fragrance of its evergreen leaves. The fruit, which is of a purple color, and also the leaves, have long been used in medicine as stimulants and carminatives. The common or cherry-laurel is *Cerăsus laurocerăsus*, the Portugal laurel *Cerăsus lusitanica*, the spurge-laurel *Daphne Laurcŏla*. but these are very different from the true laurel. (See the articles.) The name is also given to other plants, as in the United States to two species of *Kalmia*, the mountain laurel and common laurel. In ancient times heroes and scholars were crowned with wreaths of bay leaves, whence the terms *laurels* in sense of honors (and similarly *bays*), and *laureate*. From the fruit of the sweet-bay or laurel several oily substances have been extracted. Thus there is the *oil of laurel*, a yellowish oil with an odor of laurel and a strong bitter taste; *laurel fat*, a yellowish-green buttery substance, used for embrocations in rheumatism, paralysis, deafness, etc. The cherry-laurel also yields a volatile poisonous oil when its leaves are distilled in water. From the cherry-laurel *laurel-water* is produced from the leaves by distillation.

Laurel, a city in Jones County, Mississippi, 7 miles N. E. of Ellisville. Its chief industry is the lumber manufacture. Pop. 8465.

Laurens (lär′enz), Henry, revolutionary patriot, was born in Charleston, South Carolina, in 1724; died in 1792. In the Revolution he was president of the Council of Safety, and of the Continental Congress. In 1779 he was minister to Holland, but falling into the hands of the British he was a prisoner in the Tower of London for 15 months. He was Peace Commissioner in 1781, and signed the preliminary treaty in Paris, with Jay and Franklin.—John, son of Henry, was confidential aide to Washington. At Yorktown he received the sword of Cornwallis. He was but 29 years of age when he died.

Laurentian (lą-ren′shi-an), in geology, a term applied to a vast series of stratified and crystalline rocks of gneiss, mica-schist, quartzite, serpentine and limestone, about 40,000 feet in thickness, lying northward of the St. Lawrence in Canada. The Laurentian apparently lies below the fossiliferous horizon, its one supposed fossil, the *Eozoon Canadense*, being now regarded as a mineral concretion. (See *Eozoon*.) The terms *Archæan* and *Pre-Cambrian* are used in Britain for rocks occupying a similar position to the Laurentian. See *Geology*.

Laurentian Mountains, a range in Canada extending for over 3000 miles from Labrador to the Arctic Ocean, forming the watershed between Hudson Bay, the St. Lawrence and the great lakes, and dividing the same bay from the sources of the Mackenzie River. The average elevation is about 1500 feet, while some of the peaks attain a height of 4000 feet.

Laurier (lō-ri-ā), Sir Wilfrid, born at St. Lin, Quebec, in 1841; called to the bar in 1864; took up journalism and politics in 1867, and soon acquired a high reputation as writer and orator. He entered the Quebec legislature in 1871, the Dominion parliament three years later, and the Mackenzie cabinet in 1877. Ten years later he succeeded Edward Blake as leader of the Liberal party, which he carried to victory in 1896, and was at once asked to form

a ministry. He remained Premier of Canada until 1911, when he was defeated in the contest for reciprocity in trade with the United States.

Laurium (la′ri-um), a village of Houghton County, Michigan, in the extreme N. W. of the State, and on the Mineral Range and Copper Range R. Rs. It is in one of the richest copper ore regions of the United States. Pop. 8537.

Laurium, a promontory and hill range of Attica, Greece, formerly famous for its silver and lead mines. The working of these has been recently resumed. Cadmium and manganese are also found.

Lausanne (lō-sånn), a town in Switzerland, capital of the canton of Vaud, on the slopes of Mount Jorat, about ½ mile from the Lake of Geneva and 31 miles northeast of the town of Geneva. Lausanne is built on three hills, two of which are connected by a lofty viaduct, and the most interesting building is the Gothic cathedral, founded about A.D. 1000. Lausanne has little trade or manufactures, but it is much visited by tourists, and its educational institutions attract many foreign pupils. In 1875 it became the seat of the supreme court of the republic. Pop. 53,577.

Lausitz. See *Lusatia.*

Lava (lå′va), the general term for all rock-matter that flows, or has flowed, in a molten state from volcanoes, and which when cooled down forms varieties of tufa, trachyte, trachytic greenstone and basalt, according to the varying proportions of felspar, horn blende, augite, etc., which enter into the composition of the mass, and according to the slowness or rapidity with which it has cooled. The more rapidly this process of cooling goes on the more compact is the rock.—*Lava beds* are of two kinds, namely, *contemporaneous* and *intrusive.* A *contemporaneous lava bed* is one which has been poured out over the surface of one deposit, and covered by subsequent deposits. Such a bed is in its natural position, and usually alters only the bed beneath it. *Intrusive beds* are those which have been forced up in a molten state through or between strata, altering those on both sides.

Laval (la-val), a town of France, capital of the department of Mayenne, and on an acclivity washed by the River Mayenne, 154 miles W. S. W. of Paris. It is an interesting and picturesquely situated place; and among its principal edifices are Trinity Church (now the cathedral), the church of the Cordeliers, and an ancient castle, now a prison. The manufactures consist of damasks and other linen goods, flannels, etc. Pop. (1906) 24,874.

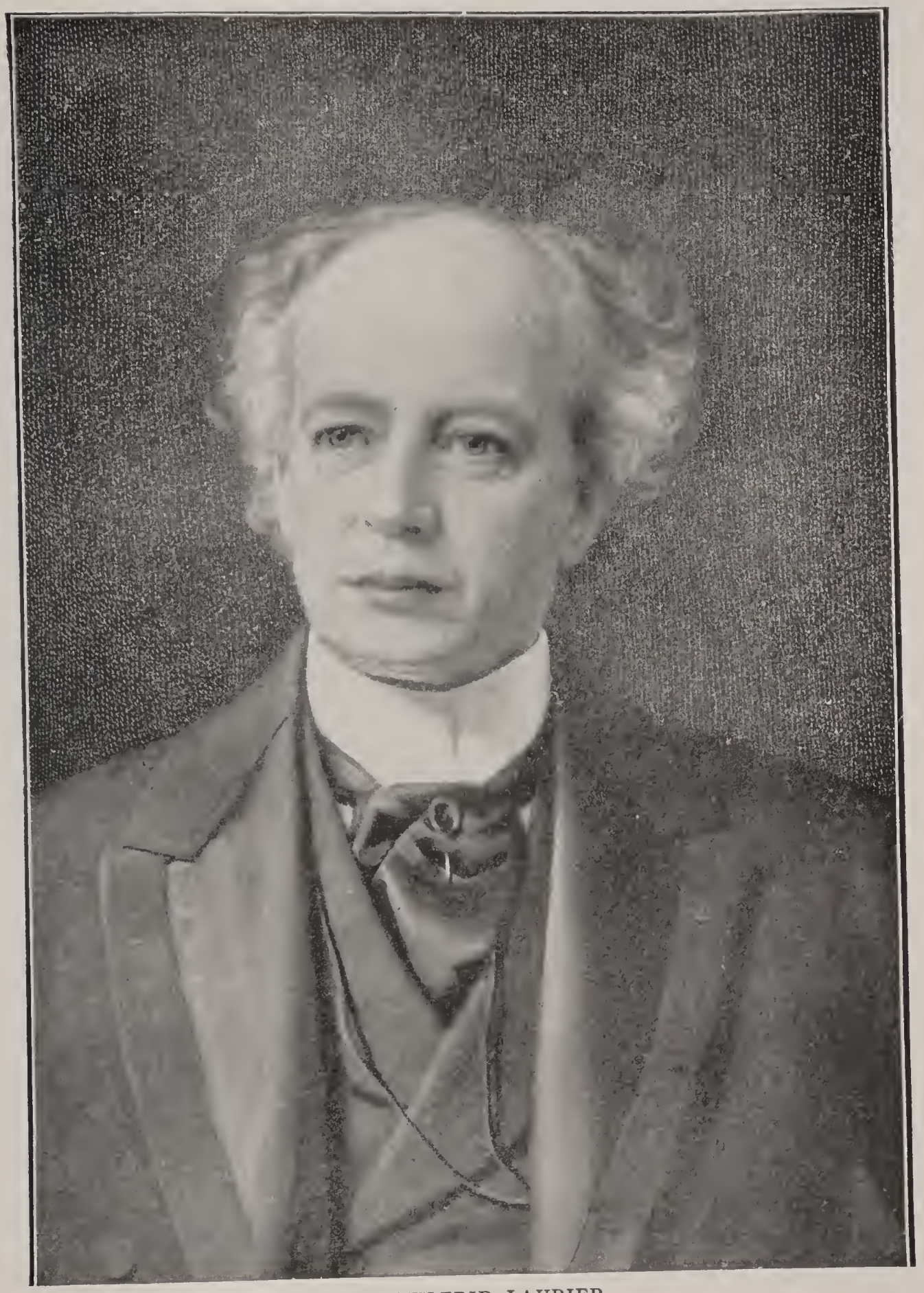
La Vallière (vål-yār), LOUISE FRANÇOISE DE LA BAUME LE BLANC DE, was born in Touraine in 1644; died 1710. The descendant of an ancient family, she was brought to court by her mother, became mistress to Louis XIV, and bore him four children. The king raised the estate of Vaujour into a duchy and a peerage in favor of her and her children. Superseded at court by Madame de Montespan, she retired to a Carmelite convent in 1674, where she died. She left a collection of letters, and a work entitled *Réflexions sur la Miséricorde de Dieu.*

Lava Millstone, a hard and coarse basaltic millstone, obtained from quarries near Andernach on the Rhine.

Lavandula (la-van′du-la), a genus of perennial under shrubs and herbs, nat. order Labiatæ, natives of dry hilly places in the Mediterranean region, the Canary Islands, Madeira, etc. See *Lavender.*

Lavater (lå-vå′ter), JOHANN CASPAR, celebrated as a physiognomist, was born in 1741 at Zürich, Switzerland, and died in 1801. He first appealed to the public as a poet in 1767, and then became pastor of a Zürich church in 1774. Lavater is best known, however, as the originator of a system by means of which, when applied to the lines and contours of the face, he claimed to be able to read the character of its owner. He adopted the idea in 1769, and published his great work under the title of *Physiognomical Fragments* (4 vols., 1775-78). This book contained many valuable engravings of distinguished people, with enthusiastic comments by the author. Later, Lavater seems to have doubted his own theory in some degree. He published several other works; was imprisoned for the boldness with which he denounced the excesses of the French revolution; was shot in the street while succoring the wounded when Zürich was captured by Masséna in 1799, and died from the effects of his wound in about a year. His work on *Physiognomy* was translated into English by Hunter (London, 1789).

Lavaur (lå-vōr), a town of France, dep. of Tarn, 23 miles southwest of Alby. Its castle was stormed in 1211 by Simon de Montfort and the refugee Albigenses were massacred. Pop. 4069.



SIR WILFRID LAURIER
Former Prime Minister of Canada.

Lava Ware, a kind of coarse ware resembling lava, made from iron slag, cast into urns, tiles, table-tops, etc.

Laveleye (lȧv-lā), EMILE DE, a well-known Belgian economist, born in 1822; educated at Bruges and Paris; published his first work in 1847, and became professor of economics at the University of Liège in 1864. He published many works on the science of economics, of which we may mention—*Etude d'Economie Rurale* (1864), *Eléments d'Economie Politique* (1882), and *Le Socialisme Contemporain.* He died in 1892.

Lavender (lav'en-der; *Lavandŭla vera*), a delightfully fragrant shrub 3-4 feet high, nat. order Labiatæ, a native of the south of Europe. Under favorable conditions it contains one-fourth of its own weight in camphor. It also produces a volatile oil, which is much in demand as an excellent perfume. This oil is got by distilling the flowers. It has a pale-yellow color, aromatic odor, and a hot taste. Besides being employed as a perfume, it is used in medicine as a stimulant in hysteria, colic, and other affections. *Spirits of Lavender* is prepared by digesting the fresh flowers in rectified spirits and distilling. *Lavender-water* is a solution of oil of lavender in spirit along with otto of roses, bergamot, musk, cloves, rosemary, etc. This preparation after standing for some time is strained and mixed with a certain proportion of distilled water. Enough oil is produced annually in England to make 30,000 gallons of lavender-water.

Laver (la'ver), a name given to two species of algæ of the genus *Porphyra—P. laciniata* and *P. vulgāris.* They are employed as food, salted, eaten with pepper, vinegar and oil; and are said to be useful in scrofulous affections and glandular tumors.—*Green laver* is the *Ulva latissima.* It also is employed as food, stewed and seasoned with lemon-juice, and is ordered for scrofulous patients.

Lavoisier (lȧ-vwä-si-ā), ANTOINE LAURENT, a celebrated French chemist, was born at Paris in 1743. The son of wealthy parents, he was educated at the Collège Mazarin, studied mathematics and astronomy under Lacaille, worked in the laboratory of Rouelle, and received lessons on botany from Bernard de Jussieu. His first public distinction was to receive the prize for the best essay on lighting the streets of Paris (1766). About this period he published several treatises, traveled through France collecting material for a geological chart, became an associate of the Academy in 1768, and obtained the post of farmer-general of taxes in 1769. His wealth and position enabled him to extend his researches, and the new discoveries of Priestly, Black and Cavendish gave impetus and direction to his studies. He was the first to organize the methods of chemistry and establish its terminology. His most famous discoveries were those of oxygen gas and the chemical theory of combustion. Accused before the Convention as an ex-farmer-general, he was guillotined in 1794.

Law. See *Commercial Law, Canon Law, Civil Law, Common Law, International Law,* etc.

Law, RIGHT HON. ANDREW BONAR, a British statesman born in New Brunswick, Canada, 1858. Settling in Glasgow, he became an ironmaster. In 1900 he was elected representative to Parliament; in 1911 he was chosen leader of the Unionist Party in the House of Commons. He has taken a deep interest in the tariff reform, has opposed the Home Rule bill (1912), and is recognized as one of the ablest debaters in the House

Law (lą), JOHN, of Lauriston, a celebrated financial projector, son of a goldsmith of Edinburgh, born in 1671: died in 1729. In 1694 he fled from his country in consequence of a duel; visited Genoa and Venice, where he accumulated a fortune by gambling; settled in France, and floated his celebrated Mississippi Company. His immediate success was so great that he was made a councilor of state and comptroller-general, but the large amount of paper-money issued depreciated the shares, and led to the collapse of his schemes an a financial panic of frightful proportions. Obliged to flee from France, he wandered about Europe as a gambler, and died at Venice in poverty. A volume entitle *Œuvres de J. Law* was published at Paris in 1790.

Law, WILLIAM, a divine of the church of England, born in 1686; died in 1761. He was in a degree a mystic and published a translation of the works of Jacob Boehme. His best-known book is the *Serious Call to a Devout and Holy Life.*

Lawn Tennis (lạn ten'is), a modified development of an old English game, played with rackets and India rubber balls. The players number two, four or more, forming even sides. The ground on which the game is played is usually 78 ft. long by 30 ft. broad. This space is divided by a net 24 ft. wide, 3 ft. 6 in. high at the ends, and 3 ft. in the center; the extreme ends of the area are called *the base lines.* The space on either side of the net thus marked off is called a *court.* This court has two lines

running through it; one of these is called the *central line*, and runs lengthwise; the other is known as the *service line*, and runs parallel to, and 30 ft. distant from the central net. The ground thus divided is called the right and left courts. The mode of playing with two is, that one is called the server or 'hand-in,' while the other is 'hand-out.' When the ball is served by 'hand-in' the server must stand with one foot outside the *base line* of the court, beginning on the right side, and his aim is to bat the ball across the net and into the court diagonally opposed. If the server fails to do this it is called 'fault,' and he must serve again. When the ball is properly served it is the opponent's duty to return it across the net before it touches the ground a second time. Should the ball not be returned, 'hand-in' scores a point; on the contrary, should the ball not be properly served, 'hand-out' scores. The player who first scores fifty wins the game.

Law of Nations. See *International Law.*

Lawrence (lą'rens), a city and one of the capitals of Essex County, Massachusetts, on both sides of the Merrimac River, 26 miles north of Boston. The principal buildings are the courthouse, state university, opera-house, etc. The river here yields immense water power, and the cotton, woolen and worsted mills are among the largest on the earth. There are also large paper mills, steam engine works, and other industries. Pop. 85,892.

Lawrence, St., a Roman deacon and martyr. During the Valerian persecution the saint was commanded to reveal the treasures of the church. For answer he collected the poor and sick and presented them as the treasure which secured heaven. For this he is said to have been burned in the year 258. His day in the Catholic Church is August 10.

Lawrence, St., one of the largest rivers in the world, which drains the great chain of N. American lakes. The streams connecting the lakes are known as the Niagara, Detroit, St. Clair and St. Mary's rivers, and the headwaters as the St. Louis, the name St. Lawrence being confined to the stream between Lake Ontario and the ocean. It receives the Ottawa, its principal auxiliary, at Montreal, as also the St. Maurice, the Saguenay, and numerous other large rivers from the north. The river is navigable for Atlantic steamers to the city of Montreal, 600 miles up, and from Montreal upwards by river and lake steamers. The rapids between Montreal and Lake Ontario are passed by means of canals, and Niagara Falls by the Welland Canal. The river's breadth between Montreal and Quebec is from ½ mile to 4 miles; the average breadth, about 2 miles. Below Quebec it gradually widens till it enters the Gulf of St. Lawrence (see next article). From the beginning of December to the middle of April the navigation is totally suspended by ice. In part of its course it forms the boundary between the United States and Canada.

Lawrence, St., Gulf of, a large inlet of the North Atlantic in British North America, forming the continuation of the estuary of the river St. Lawrence, and separated from the Atlantic chiefly by the island of Newfoundland, Cape Breton and Nova Scotia. It communicates with the ocean by the opening betwixt Newfoundland and Cape Breton, about 65 miles wide, by the Strait of Belle-Isle and the Gut of Canso. It contains numerous islands.

Lawrence, Amos, merchant, was born in Groton, Massachusetts, in 1786. In partnership with his brother Abbott a very large business was established, including manufactures. In 1831 Amos retired, and engaged in acts of beneficence, expending $640,000 for charitable purposes. He died in 1852. —His brother, Abbott, was born in Groton, Massachusetts, in 1792; in 1834 he was elected to Congress; in 1848 was candidate for vice-president, and in 1849 was minister to Great Britain. Died in 1855.

Lawrence, Sir Henry Montgomery, born at Mattura, Ceylon, in 1806. He proceeded to India in 1821 and served in the Afghan campaign of 1843. At the outbreak of the mutiny he was made commander-in-chief of the province of Oude; having retired to the residency of Lucknow, he organized the defense, but was killed by a shell, July 2, 1857.

Lawrence, James, naval officer, born at Burlington, New Jersey, in 1781, entered the navy as midshipman in 1797, and was with Decatur as first lieutenant in the engagement against Tripoli. As captain of the *Hornet* in 1813, he captured the *Peacock* in a 15-minute fight. Put in command of the frigate *Chesapeake*, he was challenged to fight by the *Shannon* while lying at Boston and partly equipped. He put to sea in this condition, with the result that his ship was taken and he mortally wounded. He won lasting fame by calling out, while being carried below, 'Don't give up the ship!'

Lawrence, John Laird Mair, Lord, Governor-general of In-

dia, born in Yorkshire in 1811; died in London in 1879. Educated at the college of Haileybury, he went to India in 1829, where his rare administrative ability attracted attention, and caused him to receive the appointment of chief-commissioner of the Punjab in 1853, after he had served in minor posts. The wisdom of this appointment was demonstrated during the Indian Mutiny of 1857. By the influence which he had gained over the Sikhs, Lawrence was able not only to keep the Punjab quiet, but to collect native forces and send them to assist in the early capture of Delhi. He was known as the savior of India, and his services were rewarded by his being made governor-general in 1863. On his return to England in 1868 he was raised to the peerage.

John, Lord Lawrence.

Lawrence, a city, capital of Douglas County, Kansas, on the S. bank of Kansas River, 29 miles E. of Topeka. It is the seat of the University of Kansas, and the Haskell Institute for instruction of the Indians. Founded in 1854, it was a center of the Kansas disturbances of the following years and was partly burned by guerrillas in 1863. It has important manufacturing industries and large nurseries. Pop. 12,374.

Lawton, a city in Comanche County, Oklahoma, 49 miles S. E. of Hobart. It has ginning, lumbering and milling interests. Pop. 7788.

Lawsonia (lą-sō'ni-a), a genus of plants belonging to the natural order Lythraceæ, containing only one species (*L. alba*), which is widely cultivated, especially in oriental regions. It is the plant from which henna is obtained. It is a tall, slender shrub, with a profusion of small, white, fragrant flowers; it is sometimes spiny, and in this state has been described under the name of *L. spinosa;* when without spines it has been called *L. inermis.* See *Henna.*

Lawson's Cypress (*Cupressus Lawsoniana*), a species of cypress found in the valleys of Northern California, where it grows to the height of 100 feet. It was introduced into Britain in 1852, and has become a favorite in ornamental grounds. The branches are numerous and are drooping, slender, and regularly disposed, forming a symmetrical columnar mass of rich green spray.

Lawton (lą'ton), HENRY W., soldier, was born in Ohio in 1843. He served through the Civil war and enlisted in the regular army in 1866 as second lieutenant. In the Spanish war he served at Santiago as brigadier-general, and in 1899 was sent to Manila. Here he took an active part in the fighting and was killed in an engagement at San Mateo, December 21, 1899.

Layamon (lā'å-mon), also called LAWEMAN, author of the *Brut,* a metrical chronicle of Britain from the arrival of Brutus to the death of King Cadwalader in A.D. 689, flourished soon after 1200 A.D. From his own account he was a priest, and resided at Ernley, near Radstone, or Redstone, now Lower Arley, on the Severn, in Worcestershire, where he seems to have been employed in the services of the church. Layamon's *Brut* is mainly an amplified translation of the French *Brut d'Angleterre* of Wace, itself merely a translation with additions from Geoffrey of Monmouth's *Historia Britonum,* and that again confessedly a translation from a Welsh or Breton original. Layamon's work appears to have been completed in the first years of the thirteenth century. Its value is chiefly linguistic.

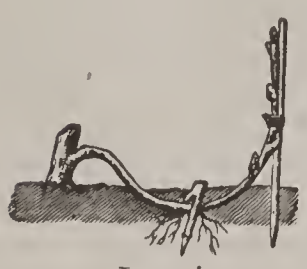
Layard (lā'ård), SIR AUSTIN HENRY, an English traveler, archæologist and diplomatist, was born in 1817 of a family originally French, and was partly educated in Italy. In 1839 and following years he traveled in the East, and in 1845 began his celebrated excavations on the site of ancient Nineveh, publishing the results of his discoveries in 1849-53. He was appointed attaché to the British embassy at Constantinople in 1849. In 1852 he entered Parliament in the Liberal interest; became under-secretary for foreign affairs in 1860, commissioner of works in 1869, and ambassador to the Porte in 1877 under Lord Beaconsfield's government, when

he accomplished the annexation of Cyprus. He is best known by his books: *Nineveh and its Remains* (1849) and *Discoveries in the Ruins of Nineveh and Babylon* (1853). Died in 1894.

Laybach. See *Laibach.*

Lay Brothers, are an inferior class of monks employed as servants in monasteries. Though not in holy orders, they are bound by the three monastic vows of poverty, chastity and obedience. They wear a dress somewhat different from that of the other monks. In nunneries a similar distinction prevails between the nuns proper and the lay sisters.

Layering (lā'ėr-ing), in gardening, the propagation of plants by bending the shoot of a living stem into the soil, the shoot striking root while being fed by the parent plant. The figure shows the branch to be layered bent down and kept in the ground by a hooked peg, the young rootlets, and a stick supporting the extremity of the shoot in an upright position.



Layering.

Lay-figure, a jointed human figure used by painters, made of wood or cork, which can be placed in any attitude, and serves when clothed as a model for draperies, etc.

Laynez (lī-neth'), JACOBO, second general of the Jesuits, born in Castile in 1512; died in 1565. He was educated at the University of Alcala, and from that he went to Paris, where he made the acquaintance of Ignatius Loyola. Laynez was ordained priest in Venice 1537, and while there he and Loyola formed the project of establishing the Society of Jesus. After the order had been confirmed by Paul III (1540), and Loyola, at the request of Laynez, had been appointed the first general, he made many journeys for the purpose of extending the society of the Jesuits, and in 1558 he succeeded Loyola as general of the order.

Lazaretto (laz-ėr-et'tō), a public building, hospital, or pesthouse, for the reception of those afflicted with contagious diseases. It is more particularly applied to buildings in which quarantine is performed. See *Quarantine.*

Lazarists (laz'ar-istz), or PRIESTS OF THE MISSION, an order of priests founded at Paris by St. Vincent de Paul in 1625 for the purpose of supporting missions and of ministering to the spiritual wants of the poor. The foundation was confirmed by letters-patent of Louis XIII, May, 1627, and the missionaries were erected into a congregation by Pope Urban VIII in 1631. They have houses in all quarters of the world.

Lazulite (laz'ū-līt), blue-spar, a phosphate of aluminium, magnesium and iron, a mineral of a light or indigo-blue color, crystallizing in oblique, four-sided prisms.

Lazzaroni (laz-a-rō'ne), a class of persons in Naples without employment or home. and having no settled means of support. The name is said to be derived from that of Lazarus in the parable, though it is more directly connected with the hospital of St. Lazarus, which served as a refuge for the destitute of the city. For a long time they played an important part in all Neapolitan revolutions. and under Masaniello accomplished the revolt of July 7, 1647, against the Duke d'Arcos. They are now no longer a separate class.

Lea (lē), HENRY CHARLES, historian, son of Isaac Lea, was born at Philadelphia in 1825, became a publisher, and wrote *Superstition and Force, History of Sacerdotal Celibacy, Studies in Church History* and *History of the Inquisition in the Middle Ages*, works which gave him an international reputation. He died in 1909.

Lea, ISAAC, naturalist, born at Wilmington, Delaware, in 1792. He engaged in the publishing business with his father-in-law, Matthew Carey, and became an ardent student of conchology, his writings on this subject being of high value. He was made president in 1858 of the Academy of Natural Sciences of Philadelphia. Among his writings were *Contributions to Geology, Fossil Footmarks in the Red Sandstones at Pottsville*, etc. He died in 1886.—His son, MATTHEW CAREY (1823-97), was an expert in chemistry, to which he devoted his life, making important discoveries. He was elected to the National Academy of Sciences in 1892.

Lead (led), a city of Lawrence County, South Dakota, 3 miles s. w. of Deadwood. It has a very large gold mine, employing 600 stampers. Gold jewelry is manufactured. Pop. 8392.

Lead, a metal of a bluish-gray color. When recently cut it has a strong metallic luster, but soon tarnishes by exposure to the air owing to the formation of a coating of carbonate of lead. Its symbol is Pb, atomic weight 207, specific gravity about 11.38. It is soft, flexible and inelastic. It is both malleable

and ductile, possessing the former quality to a considerable extent, but in tenacity it is inferior to all ductile metals. It fuses at about 612°, and when slowly cooled forms octahedral crystals. It is an abundant and widely distributed metal. It is a constituent of a very large number of minerals, all of which could be used as sources of it if they could be obtained in sufficient quantity. In practice the metal is got from only a few of these minerals, especially from the sulphide, carbonate and one or two others. The most important of all the ores of lead is the *sulphide* or *lead glance*, which has been described under the term *Galena*. The *carbonate*, also called *cerusite*, or *lead-spar*, like all the salts of lead, is perfectly unmetallic in its appearance, and is not infrequently rejected from among common lead ore as an earthy mineral. It occurs in veins in primitive and secondary rocks, accompanying galena and other ores of lead. It is abundant in European countries, and at different localities in the United States. *The sulphate of lead*, *anglesite*, or *lead vitriol*, was found originally at Anglesey. *Chromate of lead*, *crocoisite*, or *crocoite* was originally found in Siberia; it has since been met with in the Philippine Islands, in Brazil and in Hungary. It was in this mineral that *chromium* was first discovered. *Phosphate of lead* is found accompanying the common ores of lead, though rarely in any considerable quantity. Finely crystallized varieties are found at Leadhills in Scotland, and in Cornwall. In the ores of lead silver is a very common constituent. There are four oxides of lead: (1) The suboxide (Pb_2O), of a grayish-blue color. (2) The protoxide or yellow oxide (PbO), called also *massicot*. *Litharge* is this oxide in the form of small spangles, from having undergone fusion. (3) The red oxide (Pb_3O_4), the well-known pigment called *red lead* or *minium*. (4) The dioxide or brown oxide (PbO_2), obtained by putting red lead in chlorine water or in dilute nitric acid. Of the salts formed by the action of acids on lead or on the protoxide, the carbonate, or white lead and the acetate, or sugar, of lead are the most important. The protoxide is also employed for glazing earthenware and porcelain. Carbonate of lead is the basis of white oil-paint and a number of other colors. The salts of lead are poisonous, but the carbonate is by far the most virulent poison. Lead is one of the most easily reducible metals, and from the native carbonate can be got by simply heating with coal or charcoal. The sulphide, however, which is the most abundant of its ores, is not so readily acted on by coal, and a reverberatory furnace, or a special variety of blast-furnace, is employed. Lead obtained in this way is usually too hard for use, and it has to be subjected to a process of purification. This is effected by roasting the lead, sometimes for several weeks, in a reverberatory furnace. By this process the antimony, which is the chief impurity, is burned off, and the dross, which consists of the oxide of that metal with oxide of lead, is afterwards reduced and utilized as a source of antimony. The lead, when judged sufficiently pure, is then cast into ingots or pigs of lead. Prepared in this way the lead retains all the silver present in the original ore, and as that is always of value it used to be extracted whenever the quantity of silver present amounted to above 10 oz. per ton. 1 part of tin and 2 of lead form an alloy fusible at 350° Fahr., which is used by tinmen under the name of *soft solder*. Lead also forms an imperfect alloy with copper. With antimony lead forms the important alloy called *type-metal*. Pewter is a hard alloy of four parts of tin and 1 of lead. In these proportions the lead is not attacked by organic acids, such as acetic. For the poisonous effects of lead see *Lead Poisoning*.

Lead, an instrument used on shipboard for discovering the depth of water. It is composed of a large piece of lead shaped like an elongated clock-weight, from 7 to 11 lbs. in weight, and is attached to a line, generally of 20 fathoms length, called the *lead-line*, which is marked at certain distances to denote the depth in fathoms. When the depth is great the *deep-sea lead*, weighing from 25 to 30 lbs., is used. The line, which is much longer than the former, and called the *deep-sea line*, is marked by knots every 10 fathoms, and by a smaller knot every 5.

Lead Plaster. See *Diachylon*.

Lead Poisoning, a disease caused by the presence of lead in some quantity in the system. It may be due to lead which has been taken up by water or other beverage from lead pipes or vessels in which it has been contained. The use of lead in the arts is also a frequent cause of painful, and sometimes of fatal effects, from the metal finding its way into the system. The glazing of culinary vessels with lead; the coloring of confectionery with the chromate, chloride, or carbonate of lead; the sweetening of sour wine by litharge or oxide of lead, may all produce more or less serious lead poisoning. But the

most frequent and virulent cases occur among painters and persons engaged in white-lead factories; and four forms of disease, either simple or complicated, are apt to manifest themselves—1. Lead or painters' colic, or dry belly-ache. 2. Lead rheumatism or arthralgia. 3. Lead palsy or paralysis, more particularly of the muscles of the forearm. 4. Disease of the brain, manifested by delirium, coma, or convulsions—a form, however, of rare occurrence. Opium and cathartics are the chief medicines administered.

Leadville (led'vil), a city, capital of Lake County, Colorado, 176 miles S. W. of Denver, situated on a plateau over 10,000 feet above sea-level. The city was founded in 1859 as a mining center, and owes its rapid growth to the rich argentiferous lead mines discovered in 1877. Its annual yield of silver is very large. It has smelting furnaces, reduction works, and is an important trade center. Pop. 7508.

Leadwort (led'wurt), a name for the plants typical of the order Plumbaginaceæ.

Leaf (lēf), the green, deciduous part of a plant, usually shooting from the sides of the stem and branches, but sometimes from the root, by which the sap is supposed to be elaborated or fitted for the nourishment of the plant by being exposed to air and light on its extensive surface. When fully developed the leaf generally consists of two parts, an expanded part, called the *blade* or *limb*, and a stalk supporting that part, called the *petiole* or *leaf-stalk*. Frequently, however, the petiole is wanting, in which case the leaf is said to be *sessile*. Leaves are produced by an expansion of the bark at a node of the stem, and generally consist of vascular tissue in the veins or ribs, with cellular tissue or parenchyma filling up the interstices, and an epidermis over all. Some leaves, however, as those of the mosses, are entirely cellular. See *Botany*.

Leaf-Cutting Insects, a name given to certain species of solitary bees, from their lining their nests with fragments of leaves and petals of plants cut out by their mandibles. There are also leaf-cutting ants, which carry the fragments to their nests, where they form a soil for the growth of certain foliage of which these species of ants are fond.

Leaf-insects, the name given to orthopterous insects belonging to the family Phasmidæ, and popularly known also by the name of *walking-leaves*. Some of them have wing-covers so closely resembling the leaves of plants that they are easily mistaken for the vegetable productions around them. The eggs too have a curious resemblance to the seeds of plants. They are for the most part natives of the East Indies, Australia and South America. The males have long antennæ and wings, and can fly; the females have short antennæ, and are incapable of flight.

League (lēg), a measure of length varying in different countries. The English land league is 3 statute miles, and the nautical league 3 equatorial miles, or 3.457875 statute miles. The French metric league is reckoned as equal to 4 kilometers, or 4374 yards.

League, an alliance or confederacy between princes or states for their mutual aid or defense. What in French history is known distinctively as *The League* was headed by Henry, Duke of Guise, in 1576, against Henry III of France. Its ostensible object was the support of the Catholic religion, but the Duke of Guise had further views of his own. As Henry III was without male heirs, the throne, at his death, would pass to the Protestant Prince Henry of Navarre, to exclude whom, and to obtain the throne for himself, were the real objects of the Duke of Guise. His great popularity seemed to render the accomplishment of his design easy. The example given by Paris in his favor was followed by all the provinces. The league was sanctioned by the pope and the King of Spain. In 1588 the Duke of Guise was murdered at Blois, with his brother Louis, the cardinal, at the king's instigation. The league then declared the throne vacant, and named the third brother, Charles, Duke of Mayenne, governor-general of the kingdom. Henry III now sought aid from his former enemy, Henry of Navarre, but was assassinated by a fanatic leaguer in 1589. The war was then pursued by the league against Henry of Navarre till it was ended, in 1594, by his uniting himself to the Catholic Church, and the next year the league was formally dissolved. For certain other leagues see *Corn-laws*, *Covenant*.

Leake (lēk), William Martin, an English officer and author of works on the topography and antiquities of Greece, born in 1777; died in 1860. He entered the Turkish service, and was sent on several missions to Syria, Egypt and Greece. These travels gave a permanent direction to his studies, which were thenceforth devoted to the illustration of Grecian antiquities. His principal works are *Researches in Greece*, etc. (1814); *Topography of Athens* (1821); *Journal of a Tour in Asia Minor* (1824); *Travels*

A CEDAR OF LEBANON

in the Morea (1830); *Travels in Northern Greece* (1835); *Numismatica Hellenica* (1854).

Leamington (lem'ing-tun), a municipal borough and watering-place of England, in Warwickshire, 2 miles east of Warwick, with which it is united in parliamentary representation. Its sheltered position and the beauty of its scenery, together with the excellence of its medicinal springs, have gained it much favor and the name of 'Leafy Leamington.' The springs, which include the three varieties of sulphurous, saline and chalybeate, attract numerous visitors. Pop. (1911) 26,717.

Leander. See *Hero.*

Leap-year (lēp-yēr), one of the years which contain 366 days, being every fourth year, which leaps over a day more than a common year. Thus in common years, if the first day of March is on Monday the present year, it will the next year fall on Tuesday, but in leap-year it will leap to Wednesday, for leap-year contains a day more than a common year, a day being added to the month of February. Every year is a leap-year which is divisible by 4 without remainder, except the concluding years of centuries, every fourth only of which is a leap-year; thus the years 1800 and 1900 were not leap-years, but 2000 and 2400 will be.

Lease (lēs), a permission to occupy lands or tenements for life or a certain number of years, or during the pleasure of the parties making the contract. The party letting the lands or tenements is called the *lessor*, the party to whom they are let the *lessee*, and the compensation or consideration for the lease the *rent*. A lease for a period not exceeding three years may be by verbal contract. If, however, the term be longer than three years, the lease must be by deed. A breach of any of the covenants contained in a lease was formerly sufficient to render it void, but now any breach may be compensated by a money payment. The power to lease necessarily depends upon the extent of the lessor's estate in the land or tenement to be leased. A proprietor who has only a life estate can of course lease his property only during his life. This is the case with a great part of the landed estates of Europe, the very object of entailments and other limitations being to secure the property against alienation, and against incumbrances to the prejudice of the heir or successor to the inheritance; and yet if the incumbent could not make a lease for a certain time it would be a great abridgment of the value of the estate to himself, as well as to his successor. The laws therefore provide that certain proprietors of estates for life may lease, on certain terms, for any time not exceeding a certain period, as twenty-one or forty years. The English common law makes a distinction as to the dignity of leasehold estates, which in many cases does not correspond to their comparative value and importance, the maxim being that a life-estate, being that of a freeholder, is greater or of more dignity than a lease for ever so many years, as a hundred or a thousand. A freehold is real estate; whereas a lease is but a chattel interest, though the term may be longer than the longest life.

Leather (leth'er), the skins of animals dressed and prepared for use by tanning, tawing, or other processes, which preserve them from putrefaction and render them pliable and tough. The skins employed are chiefly those of cattle, though the skins of horses, asses, sheep, pigs and goats are also converted into leather. Hides are received by the leather-maker in various states, those from a distance being usually cured by salting or sun-drying, sometimes by both processes. Before subjection to the process of tanning, the cured hides require to be brought back as far as possible to the condition of fresh hides by soaking and softening in water, to which sometimes salt or carbolic acid or sulphide of sodium is added. The softening is now generally assisted by machines, which subject the skins to a kneading process. They are then unhaired by the agency of lime, the customary method of liming being to spread out the hides flat in milk of lime in large pits, the hides being 'hauled' or drawn out once or twice a day, and the liquor stirred up; but there are several variations upon this method of liming. In America and on the European continent the hair is loosened by 'sweating,' which induces a partial putrefaction, attacking the root-sheaths without injuring the hide substance proper. In the old method of warm sweating, the hides were simply laid in a pile and covered, if necessary, with fermenting tan; the preferable cold method consists in hanging the hides in a moist chamber at a uniform temperature of 60° or 70° F. When the hair is sufficiently loosened the hides are usually thrown into the 'stocks,' where the slime and most of the hair is worked out of them. Other unhairing processes consist in treatment with alkaline sulphides, especially sulphide of sodium or sulphide of arsenic. To remove the loosened hair, the hide is generally thrown over a beam

and scraped with a blunt two-handled knife, but several unhairing machines have been invented. After unhairing, the loose flesh and fat are scraped, brushed, or pared from the inner side, and the hides intended for sole leather are rounded or separated into 'butts' and 'offal'—the latter the thinner parts, including the cheeks, shanks and belly pieces. The butts are then suspended for from twelve to twenty-four hours in soft fresh water, and frequently shaken in it to remove lime or dirt prior to undergoing the process of tanning (see *Tanning*) and currying (see *Currying*). The brilliant smooth surface of patent, enameled, lacquered, varnished, or japanned leather is due to the mode of finishing by stretching the tanned hides on wooden frames and applying successive coats of varnish, each coat being dried and rubbed smooth with pumice stone. Other special kinds of leather are seal leather, Russia and Morocco leathers (which see). Tawed leathers (see *Tawing*) consist chiefly of the skins of sheep, lambs, kids and goats treated with alum, or some of the simple aluminous salts, the principal tawing industries being the manufacture of calf kid for boots and glove kid. Shamoy, or oil-leather, is prepared by impregnating hides and skins with oil (see *Shamoy*).

Leather, ARTIFICIAL, the general name of certain fabrics possessing some of the qualities and often the appearance of leather. One of the earliest methods of fabrication consisted in applying oily pigments to cloth which was subsequently rolled and coated with a sort of enamel paint. An article of this sort, known under the name of leather-cloth, was first produced in the United States about 1849. Another kind consists of leather parings and shavings reduced to a pulp, and then molded into buckets, machinery-bands, picture-frames, and other useful and ornamental objects. A so-called vegetable leather consists of caoutchouc dissolved in naphtha, spread upon a backing of linen. It is of considerable strength and durability, and is used for table-covers, carriage-aprons, soldiers' belts, harness, book-binding, etc. Various other substitutes for leather have been recently introduced, one consisting of cloth with a thin facing of leather; but the commonest material is still obtained by varnishing textile fabrics with coatings of some resinous substance, and then painting or embossing them.

Leatherhead, an Australian bird, the *Tropidorhynchus corniculatus*, a species of honey-eater. So called from its head being devoid of feathers and presenting a leathery appearance. Called also *friar bird.*

Leather-wood (*Dirca palustris*), nat. order Thymelaceæ, a bush of the United States, with small, yellow flowers, flexible jointed branches, and a tough, leathery, fibrous bark, which is used by the Indians for thongs. The twigs are used for baskets, etc. Called also *moose-wood* and *wicopy.*

Leaven (lev'n), dough in which fermentation has commenced, employed to ferment and render light the fresh dough with which it is mingled. Its use dates from remotest antiquity; the addition of yeast or barm being of modern date.

Leavenworth (lev'en-worth), a city of Kansas, capital of Leavenworth County, on the west bank of the Missouri, about 38 miles above Kansas City, in a rich agricultural region. There are sawmills, flourmills, brickworks, breweries, manufactories of carriages, wagons, furniture, shoes and various other industries; also coal mines in the vicinity. Apples are shipped from here in large quantities. There is a soldiers' home, a military prison, and nearby is Fort Leavenworth, a school for the instruction of officers, and a State penitentiary. Pop. 19,363.

Lebanon (leb'a-non), a city, capital of Lebanon County, Pennsylvania. It is in a rich coal and iron district. In addition to extensive iron and steel manufactures, it produces silk-machinery, carriages, organs, farming implements, etc. Pop. 19,240.

Lebanon, a city, capital of Boone County, Indiana, 25 miles N. W. of Indianapolis. It has flour, saw and planing mills, etc. Pop. 5474.

Lebanon, a town in Grafton County, New Hampshire, on the Connecticut River. Has manufactures of woolens, clothing, etc. Pop. 5718.

Lebanon, MOUNTAINS OF, two nearly parallel mountain ranges in the north of Palestine, stretching from southwest to northeast, and enclosing between them a valley about 70 miles long by 15 miles wide, known anciently as Cœlē-Syria. The range on the west is called Lebanon, and that on the east Anti-Lebanon; the Arabs, however, call the former Jebel-Libnan, and the latter Jebel-esh-Shurky. Lebanon, which runs almost parallel to the Mediterranean coast, is the far loftier range of the two, and presents almost a continuous ridge, its loftiest summit—Jebel Sunnin, near Beyrout—being about 10,000 feet above the sea. Though under the snow limit, snow and ice remain throughout the year

in the higher ravines. Anti-Lebanon claims the culminating point of the whole chain, Jebel-esh-Sheikh (about 11,000 feet). In the south part of the chain the Upper Jordan has its source. The habitable districts are occupied towards the north by the Maronite Christians, and towards the south by the Druses. The forests of cedar for which Lebanon was famed have to a large extent disappeared.

Lebedin (lye-be-dyēn′), a town of Russia in the government of Kharkov, and 75 miles west northwest of the city of that name. Pop. 14,206.

Lebrija (le-brē′*h*à), a town of Spain, Andalusia, province of Seville, and 28 miles from the city of that name. Pop. 10,997.

Lecanora (le-ka-nō′ra), a genus of lichens, a species of which yields cudbear.

Lecce (let′chā), a town in Southern Italy, capital of the province of its own name, 50 miles E. S. E. of Taranto. It has noteworthy ancient buildings, and a large tobacco factory, textile manufactures, etc., and is noted for its olive oil. Pop. 35,179.

Lecco (lek′kō), a town of Northern Italy, on an arm of Lake Como, called from it Lago di Lecco. Pop. 10,352.

Lecky (lek′i), WILLIAM HARTPOLE, an English historical writer, born at Dublin in 1838. He wrote *The Leaders of Public Opinion in Ireland; History of the Rise and Influence of the Spirit of Rationalism in Europe; History of European Morals from Augustus to Charlemagne; History of England in the Eighteenth Century* (8 vols.). He died in 1903.

Le Conte, JOHN, physicist, born in Liberty County, Georgia, in 1818; died in 1891. He was professor of physics, industrial mechanics and physiology in the University of California from 1869 till his death, and was president of that institution from 1876 to 1881. He wrote a large number of papers on scientific subjects.

Le Conte, JOHN LAWRENCE, naturalist, born at New York, in 1825; died in 1883. He was surgeon of volunteers during the Civil war and chief clerk of the United States mint in Philadelphia from 1878 till his death. He traveled widely in the United States, making scientific researches, and secured large collections of botanical, zoological and other specimens, which at his death were given to the Museum of Comparative Zoology, Cambridge, Mass.

Le Conte, JOSEPH, scientist, born in Liberty County, Georgia, in 1823. He practiced medicine for several years at Macon, Georgia, but in 1850 went to Cambridge, Massachusetts, where he studied natural history under Agassiz. He subsequently held several professorships, and after 1869 occupied the chair of geology and natural history in the University of California. He died in 1901.

Lectern (lek′tėrn), the reading desk or stand on which the larger books used in the service of churches are placed.

Leda (lē′da), in Greek mythology, the wife of the Spartan king Tyndarus. By Zeus, who took the form of a swan, she was the mother of Castor and Pollux.

Lee (lē), in nautical language, refers to the side towards which the wind is blowing, *leeward* and *windward* being opposite terms. A *lee shore* is one to leeward of a vessel. A vessel's *leeway* is the amount that she drifts from her proper course.

Lee, FITZHUGH, general, a grandson of Henry ('Light-Horse Harry') Lee, of Revolutionary fame, was born in Virginia in 1835. He was graduated at West Point in 1856, and at the outbreak of the Civil war became a general of cavalry in the Confederate army. In 1885 he was elected Governor of Virginia and reëlected for the succeeding term. In 1895 he was deputed by President Cleveland as Special Consul to Havana, where he remained until the rupture with Spain in 1898. He carried out his duties with much circumspection and received a great ovation on his return to America. He died in 1905.

Lee, FRANCIS LIGHTFOOT, signer of the Declaration of Independence, was born in Stratford, Virginia, in 1734; died in 1797. He was a member of the Continental Congress, 1775-1779, often presiding in committee of the whole; and was a framer of the articles of confederation.

Lee, HENRY, an American Revolutionary general, born in Westmoreland County, Virginia, in 1756; educated at Princeton College, and in 1776 appointed captain of a company of cavalry in Colonel Bland's Virginia regiment, and served in Washington's army until 1780, where he joined General Greene in the South. In the memorable retreat of Greene before Lord Cornwallis, Lee's legion acquired fame as the rear-guard of the American army, the post of the greatest danger. At the battles of Guildford Courthouse and Eutaw, and in other affairs, Lee specially distinguished himself. He was known in the army as 'Light Horse Harry.' On the conclusion of the

war he was sent to Congress as a delegate from Virginia, and in 1792 was chosen governor of that State. In 1799, on the death of Washington, he was selected to pronounce an eulogy on him, and characterized him as 'first in war, first in peace, and first in the hearts of his countrymen.' In 1801 he retired from public life. He died in 1818.

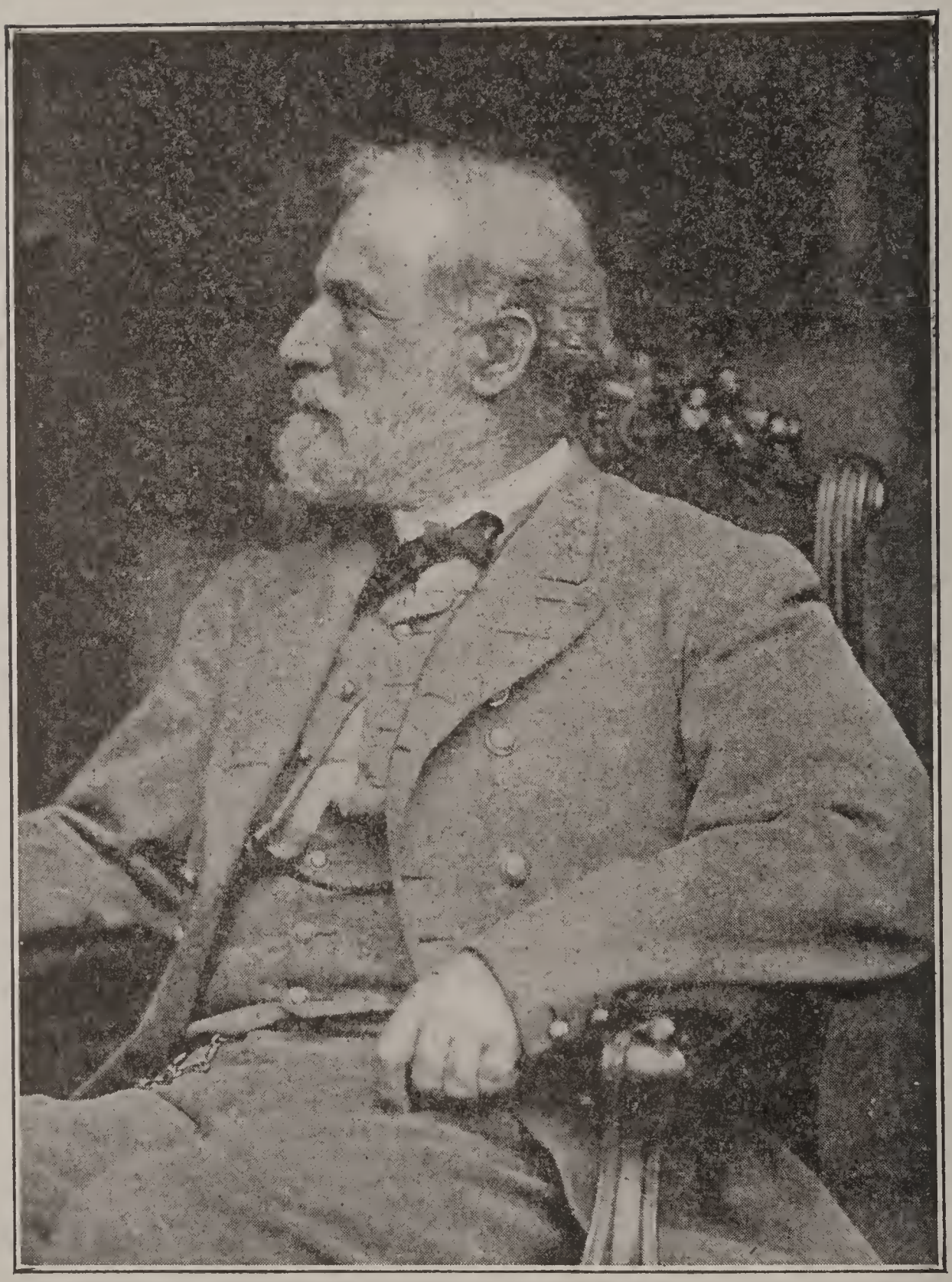
Lee, NATHANIEL, an English dramatic poet, born about 1657, and educated at Cambridge, whither he went in 1668. He afterwards went to London, and in 1675 produced his tragedy of *Nero*, from that time to 1681 producing a tragedy yearly, the best known being the *Rival Queens* (1677). He also tried his abilities as an actor, but failed in the attempt. In 1684 he became insane and was confined in Bedlam until 1688, when he was discharged and wrote two more tragedies, the *Princess of Cleves* and the *Massacre of Paris*, which appeared in 1689 and 1690. He died in 1691 or 1692.

Lee, RICHARD HENRY, a distinguished American of the Independence era, born Jan. 20, 1732, at Stratford, Westmoreland County, Virginia. He received a part of his education in England, and after his return to his native country was chosen a delegate to the House of Burgesses from Westmoreland County. In the opposition to unjust British claims he played throughout a most important part, and on being sent as delegate from Virginia to the first American Congress at Philadelphia (1774) was at once recognized as a leader in that assembly. He drew up most of those addresses to the king and the English people which were admitted by his political opponents to be unsurpassed by any of the state papers of the time. When war became inevitable Lee was placed on the various committees appointed to organize resistance. On the 7th of June, 1776, he introduced the motion finally breaking political connection with Britain. In consequence of weak health he was unable to serve in the field, but his activity as a politician was as unceasing as valuable. In 1784 he was unanimously elected president of the Congress, and when the federal constitution was established he entered the Senate for his native State. In 1792 he retired into private life, and died in Virginia in 1794.

Lee, ROBERT EDWARD, general, commander-in-chief of the Confederate army, one of the most skilful tacticians who took part in the great Civil war, was born in Virginia in 1807, the son of General Harry Lee, of Revolutionary fame. In 1829 he left the military academy of West Point with the rank of second lieutenant of engineers. After making a tour in Europe he obtained a captaincy in 1838, and in 1847 was appointed engineer-in-chief of the army for the Mexican campaign, in which his brilliant services at Cerro-Gordo, Contreras, Cherubusco and Chapultepec (at the latter he was wounded) speedily gained for him the

General Lee.

rank of colonel. From 1852 to 1855 he was superintendent of military studies at West Point. In 1861 he became colonel of his regiment, but on the secession of Virginia from the Union he threw up his commission, in 1862 was given the command of the Virginia army, and subsequently was selected by President Davis as commander-in-chief. In June, 1862, he defeated the Federal army under McClellan, and aided by Stonewall Jackson, defeated Pope at Manassas Junction on the 30th. Lee now crossed the Potomac into Maryland and fought an indecisive battle with McClellan at Antietam, subsequently crossing the Potomac and withdrawing behind the Rappahannock. On the 13th of December he defeated the Federalists under Burnside at Fredericksburg, and on the 2d and 3d May, 1863, defeated Hooker at Chancellorsville. This victory was followed by an invasion of Pennsylvania, where he was beaten by Meade at Gettysburg, July 1st and 3d, and forced to retreat into Virginia. The campaign of 1864 was begun by the advance of General Grant on May 4. A succession of stubbornly contested battles followed from the Wilderness by way of Spottsylvania and Cold Harbor to Petersburg. The siege of Petersburg was protracted until April 2, 1865, when Grant broke through Lee's defenses, and forced him to abandon Richmond. The Union forces with their great superiority of men gradually



GENERAL ROBERT E. LEE
From a favorite photograph.

hemmed in the Confederate forces, and on April 9, Lee and his army surrendered to Grant at Appomattox Court House. General Lee retired into private life; was elected president of Washington College, Lexington, Va., in 1865. He died October 12, 1870.

Leech (lēch), a name for those Annelida or Worms that form the type of the order Hirudinea (synonyms, *Suctoria*, *Discophora*) of that class. The distinctive feature of the leeches consists in the presence of one or two sucking discs. The rings or segments of the body are very numerous and closely set. Usually leeches breathe either by the general surface of the body or by little sac-like pouches known as the respiratory *sacculi*. They chiefly inhabit fresh-water ponds, though some live among moist grass, and some are marine. The familiar horse leeches (*Hæmopsis sanguisūga*) of fresh-water ponds and ditches are included in this group. The land leeches of Ceylon are terrestrial in habits, living among damp foliage and in like situations. They fasten on man and beast, and are a serious pest to travelers. The species generally employed for medical purposes belong to the genus *Sanguisūga*, and are usually either *S. officinālis* (the Hungarian or green leech), used in the south of Europe, or *S. medicinālis* (the brown-speckled or English leech), used in the north of Europe. The latter variety, however, is now rare in England, owing to the drainage of bogs and ponds. The mouth, situated in the middle of the anterior sucker, is provided with three small white teeth, serrated along the edges, and capable of inflicting a peculiar Y-shaped wound, which, like that produced by the soldier's bayonet, is difficult to close, and permits a large and continuous flow of blood. From 4 drachms to 1 oz. may be stated to be the average quantity of blood that can be drawn by a leech. After detaching themselves, leeches are made to disgorge the blood they have drawn by being placed in a weak solution of salt, or by having a little salt sprinkled over them. Leeches appear to hibernate in winter, burying themselves in the mud at the bottom of the pools, and coming forth in the spring.

Leech, the border or edge of a sail which is sloping or perpendicular.

Leech, John, an English artist and humorist, born in London in 1817; educated at the Charterhouse School. He studied at St. Bartholomew's Hospital for a time, but forsook medicine, and commenced drawing on wood for publications. His first important work was illustrations to the *Ingoldsby Legends*. In 1841 he joined the staff of *Punch*, his first drawing appearing in August of that year. For that periodical he worked with preëminent success, supplying weekly political satires and pictures of all phases of English life, showing no less artistic power than versatile humor. He died suddenly in 1864. His designs for *Punch* have nearly all been republished as *Pictures of Life and Character*, and as *Pencilings from Punch*. He also executed the illustrations for *Mr. Sponge's Sporting Tour*, *The Comic History of England*, and other books. No artist has excelled John Leech in his particular line of artistic production.

Leechee. See *Litchi*.

Leeds (lēds), a borough and manufacturing city of England, in the West Riding of Yorkshire, on the river Aire, which here becomes navigable, and is crossed by eight bridges; 185 miles by railway N. N. W. from London. Among the most conspicuous of the public buildings are the town hall, considered one of the finest municipal buildings in the kingdom; the infirmary, a building in the Gothic style; the municipal offices and free library and the royal exchange. The University of Leeds has handsome buildings and about 1200 students. In the vicinity is Kirkstall Abbey, a noble ruin which belongs to the borough, and in the environs is a beautiful park of 300 acres. Leeds has been for generations the chief seat of the woolen manufacture of Yorkshire. In the wholesale clothing trade several thousand hands are employed, as also in steel works, iron foundries, rolling-mills, tool and machine factories. The boot and shoe factories, the leather trade, and the cloth-cap trade also employ large numbers of men and women, and there are extensive color-printing works, tobacco manufactories, chemical and glass works, works for making drainage pipes, fire-bricks, terra cotta, pottery, etc. Nearly a hundred collieries are worked in the district. The history of Leeds extends over more than 1200 years, the town being mentioned under the name of *Loid* or *Loidis* by the Venerable Bede as the capital of a small British kingdom about 616. Leeds was not made a parliamentary borough till 1832, when it was allotted two members; in 1867 it got a third, and in 1885 two more. In the neighborhood is the fine ruin of Kirkstall Abbey. Pop. (1911) 445,568.

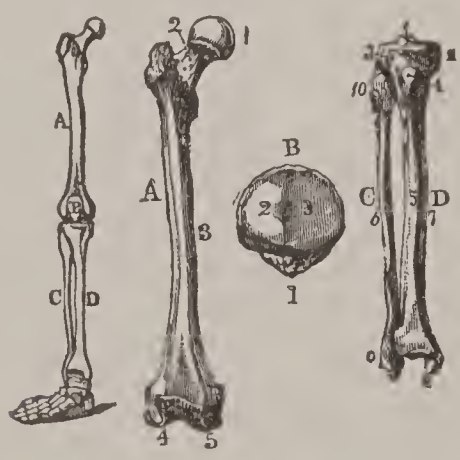
Leek (lēk; *Allium Porrium*), a mild kind of onion much cultivated for culinary purposes. The stem is rather tall, and the flowers are disposed in large

compact balls, supported on purple peduncles. See also *Allium*.

Leek, a market town of Staffordshire, England, picturesquely situated in the valley of the Churnet, 28 miles from Manchester. The staple industry is the manufacture of sewing silks and silk trimmings, silk dyeing, etc. Pop. 16,665.

Leeuwarden (lā'ų-vår-den), a town of Holland, capital of the province of Friesland, on the Ee, 70 miles northeast of Amsterdam, intersected by numerous canals. The principal edifices are the palace of the former stadtholders of Friesland, several churches, town house and provincial courthouse. The industrial establishments are various. Pop. 32.203.

Leeuwenhoeck (lā'ų-ven-hök), ANTONY VAN, a Dutch microscopist, born in 1632; died in 1723. He completed Harvey's discovery of the circulation of the blood by showing that it passes from the arteries to the veins through the capillaries. He also discovered the red corpuscles of the blood, the spermatozoa, the infusorial animalcules,



BONES OF THE HUMAN LEG.

A, Femur: 1, Head; 2, Neck; 3, Shaft; 4, External condyle; 5, Internal do. B, Patella: 1, Apex of the bone. 2, Surface of articulation, with external condyle of the femur; 3, Do. with internal condyle. C, Fibula: 6, Shaft; 9, Lower extremity, the external malleolus; 10, Upper extremity. D, Tibia: 1, Spinous process; 2, Inner tuberosity: 3, Outer do.; 4, Tubercle; 5, Shaft; 7, Internal surface of shaft; the sharp border between 5 and 7 the crest of tibia; 8, Internal malleolus.

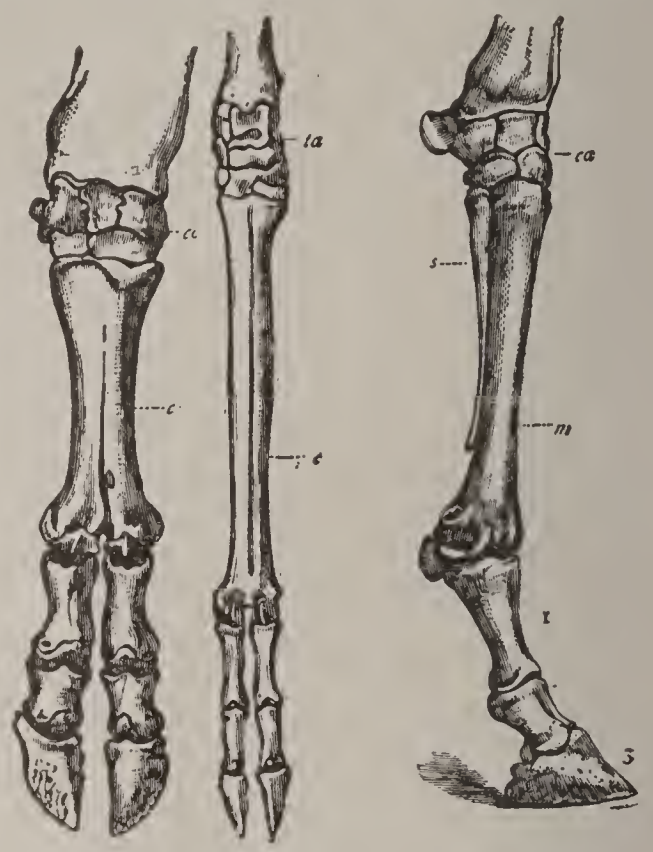
etc. He contributed papers to the *Philosophical Transactions* of the Royal Society, London.

Leeward (lē'wård, lö'ård), in nautical phraseology, a term that refers to the quarter towards which the wind blows. See *Lee*.

Leeward Islands. See *West Indies*.

Lefkosia. See *Nicosia*.

Leg, any limb of an animal that is used in supporting the body, and in walking and running; in a narrower sense, that part of the human limb from the knee to the foot. The human leg has two bones, the inner called the *tibia* or shin-bone, the outer called the *fibula* or clasp-bone. The tibia is much the larger



A B C

A, Foreleg of Ox (*Bos taurus*). B, Hind-leg of stag (*Cervus elaphus*). *ca*, Carpus; *ta*, Tarsus; *c*, 'Canon-bone,' composed of the united metacarpals or metatarsals of the third and fourth digits. C, Foreleg of horse. *ca*, Carpus; *m*, Metacarpal of the third digit; *s*, 'Splint-bone,' or rudimentary metacarpal; 1, First phalanx or 'great pastern'; 2, Second phalanx or 'small pastern'; 3, Third phalanx or 'coffin-bone.'

of the two, and above is connected with the thigh-bone to form the knee-joint, the fibula being attached to the outer side of its head. In front of the knee-joint, situated within a tendon, is the knee-cap or *patella*. (See *Knee*.) The lower end of the tibia and of the fibula enter into the ankle-joint, the weight being conducted to the foot by the tibia. (See *Foot*.) In the foreleg are muscles which extend the foot, and on the back of the leg are two large muscles which form the bulk of the calf of the leg, and which unite in a thick tendon, the *tendo Achillis*. These muscles are used in walking, jumping, etc.

Legacy (leg'a-si), a gift by will of personal property, as goods and chattels; a testamentary gift of real property being called a *devise*. The mode of compelling executors to pay a legacy

is by suit in equity for the administration of the testator's assets; courts of common law have not, in general, any jurisdiction. Executors cannot be compelled to pay a legacy until the expiration of a year after the testator's death. After a legacy is paid the legatee must refund if it should be necessary for the payment of creditors who come in, although after the period above mentioned. The party to whom a legacy is bequeathed is the *legatee*.

Legates (leg'ăts), persons sent by the pope as ambassadors to foreign courts. Legates *a latere*, the highest in rank, were sent on particularly important missions, and were taken from the college of cardinals only.

Legation (le-gā'shun), the body of official persons attached to an embassy. Formerly in Italy legation signified a division of the States of the Church.

Legato (le-gä'tō; Italian), in music, a word used in opposition to *staccato*, and implying that the notes of the movement, or passage to which it is affixed are to be performed in a close, smooth and gliding manner, each note being held till the next is struck.

Legend (leg'end), originally the title of a book containing the lessons that were to be read daily in the service of the early church. The term legend was afterwards applied to collections of biographies of saints and martyrs, or of remarkable stories relating to them, because they were read at matins and in the refectories of cloisters, and were earnestly recommended to the perusal of the laity. The Roman breviaries contain histories of the lives of saints and martyrs, which were read on the days of the saints whom they commemorated. They originated in the twelfth or thirteenth century, and they contributed much to the extinction of the old German (heathen) heroic traditions. Among the best-known collections were the *Legenda Sanctorum* or *Historia Lombardica* and the *Golden Legend* (q. v.). The term is used in a general sense for any remarkable story handed down from early times, and is also applied to the motto or words engraved in a circular manner round the head or other figure upon a medal or coin and to descriptive texts beneath illustrations in books, etc.

Legendre (lė-zhäṇ-dr), ADRIEN MARIE, mathematician, born at Paris in 1752, early a professor of mathematics in the military school there, and in 1783 a member of the Academy. In 1787 he was employed along with Cassini and Mechain to measure a degree of latitude between Dunkirk and Boulogne, while English mathematicians did the same on the other side of the Channel. He died in 1833. He particularly distinguished himself by profound investigations as to the attraction of elliptical spheroids, and his method of calculating the course of the comets. His best-known work is his excellent *Eléments de Géometrie* (1794), translated into English by Thomas Carlyle, and edited by Sir David Brewster.

Legerdemain (lej-ėr-de-mān'), or CONJURING, a popular amusement or exhibition, consisting of tricks performed with such art and adroitness that the manner or art eludes observation. All the phenomena of legerdemain are referable to sleight of hand, mechanical contrivances, confederacy, or some combination of these. In the more elaborate phases of the art the aid of optical, chemical, and other sciences is utilized.

Leghorn (leg'hōrn; Italian, *Livorno*), a seaport of Northern Italy, in the province of Leghorn or Livorno, on the Mediterranean, 12 miles S. S. W. of Pisa and 50 miles W. S. W. of Florence. Leghorn is for the most part modern, and well and regularly built. It is intersected by canals, and a navigable canal connects it with the river Arno. Among objects of interest are the duomo or cathedral; the Church of the Madonna; a synagogue richly ornamented with marbles; the English chapel and cemetery (containing Smollett's tomb); the lazarettos, particularly San Leopoldo, one of the most magnificent works of the kind in Europe; etc. The manufactures are varied. Shipbuilding is carried on, and within recent years several ironclads have been constructed in the dockyards. Trade is principally carried on with the ports of the Levant and the Black Sea, and with the United Kingdom. Leghorn was a mere fishing village when it came into the possession of the Florentines in 1421, and it continued to be a place of no importance till the sixteenth century. It now ranks among the chief ports after Genoa and Naples. Pop. 96,528.

Leghorn, a kind of plait for bonnets and hats made from the straw of bearded wheat cut green and bleached; so named from being imported from Leghorn.

Legio Fulminatrix. See *Aurelius Antoninus.*

Legion (lē'jun), in ancient Roman armies a body of infantry consisting of different numbers of men at different periods, from 3000 to above 6000, often with a complement of cavalry.

Each legion was divided into ten cohorts, each cohort into three maniples, and each maniple into two centuries. Every legion had sixty centurions, and the same number of *optiones* or lieutenants and standard-bearers. The standard of the legion was an eagle.

Legion of Honor (*Légion d'Honneur*), a French order for the recognition of military and civil merit, instituted by Napoleon while consul, May 19, 1802, and inaugurated July 14, 1804. The decoration originally consisted of a star containing the portrait of Napoleon surrounded by a wreath of oak and laurel, with the legend, 'Napoléon empereur des Français'; on the reverse was the French eagle with a thunderbolt in his talons, and the legend, 'Honneur et patrie.' The order has been remodeled several times, the last occasion being subsequent to the downfall of the second empire. There are now five ranks or classes: ordinary chevaliers or knights, officers, commanders, grand-officers, grand-crosses. The profuse granting of the decoration of the order latterly brought the institution into discredit, and the number of chevaliers is now restricted to 25,000, the officers to 4000, the commanders to 1000, the grand-officers to 200 and the grand-crosses to 70. The star now bears a figure emblematic of the republic, with the inscription 'République Française, 1870,' on the reverse two flags, with the inscription 'Honneur et Patrie.'

Legros (lå-grō), Alphonse, a French artist whose work has been for the most part done in England; born near Dijon in 1837, and largely self-instructed. He went to Paris in 1851, and in 1857 exhibited for the first time in the Salon. He subsequently settled in London and in 1876 became professor at the Slade School in University College. His more important pictures are the *Anglers*, the *Pilgrimage*, the *Spanish Cloister*, the *Benediction of the Sea*, the *Baptism* and the *Coppersmith*. His etchings are of higher value, among the most noteworthy being his *Death and the Woodman* and *Le Repas des Pauvres*, both marked by a fine breadth in conception and handling.

Legumin (le-gū'min), a material which makes up the greater part of the substance of leguminous seeds, such as peas and beans, very similar to casein.

Leguminosæ (le-gū-mi-nō'sē), one of the largest and most important natural orders of plants, including about seven thousand species, which are dispersed throughout the world. They are trees, shrubs, or herbs, differing widely in habit, with stipulate, alternate (rarely opposite), pinnate, digitately compound or simple leaves, and axillary or terminal one or many flowered peduncles of often showy flowers, which are

Leguminosæ.

1, Papilionaceæ: *a*, Flower of the pea; *s*, Standard; *w*, Wings; *k*, Keel; *b*, Stamina, nine connected, one free; *c*, Legume, seeds fixed to the upper suture in one row. 2, Swartzieæ: *a*, Flower of *Swartzia grandiflora*, with its single petal and hypogynous stamens; *b*, Calyx; *c*, Legume. 3, Cæsalpinieæ: *a*, Flower of *Poinciana pulcherrima*, showing its difform interior upper petal; *b*, Calyx; *c*, Legume. 4, Mimoseæ: *a*, One flower of common sensitive plant (*Mimosa pudica*), showing its regular corolla; *b*, Stamina, hypogynous; *c*, Legume exterior; *d*, Legume interior; *e*, Legume of *Acacia arabica*. A, Curved radiele, as in Papilionaeeæ. B, Straight radicle, as in Swartzieæ and Cæsalpinieæ.

succeeded by a leguminous fruit. Four suborders are recognized: Papilionaceæ, Swartzieæ, Cæsalpinieæ and Mimoseæ. It contains a great variety of useful and beautiful species, as peas, beans, lentils, clover, lucern, sainfoin, vetches, indigo, logwood, and many other dyeing plants, acacias, senna, tamarinds, etc.

Leh (lā), or Le, the chief town of Ladakh province, in Cashmere, in a fine open valley about 11,000 feet above sea-level, and 2 miles from the right bank of the Indus, 2100 miles north of Simla. The rajah's palace and several temples here are of very rich architecture. Leh is the great entrepôt for the traffic be-

tween the Punjab and Chinese Tartary, a principal article of trade being shawl wool from the latter. Population variously estimated from 4000 to 12,000.

Lehigh River (lē'hī), a river of Pennsylvania, rising in Pike County and joining the Delaware at Easton, after a course of 100 miles, of which 70 are navigable. It is noted for beautiful, picturesque, wild scenery.

Lehighton, a borough in Carbon County, Pennsylvania, on the W. bank of the Lehigh, 4 miles S. of Mauch Chunk. It is in a coal-mining district, and has railroad shops, stone works, silk and underwear factories, etc. Pop. 5316.

Lehigh University, an institution of learning, at South Bethlehem, Pennsylvania, founded and liberally endowed by Asa Packer for the instruction (without charge) of young men from any part of the country or of the world. It has fine buildings, a library of over 60,000 vols., etc. It gives instruction in the various branches of general literature and technology, and is especially noted for the latter.

Leibnitz (līb'nits), Gottfried Wilhelm, Baron von, a German scholar and philosopher, born in 1646 at Leipzig. He studied law, mathematics and philosophy at the university of his native town, where he published a philosophical dissertation, *De Principio Individui*, as early as 1663. This was followed by several legal treatises, for example, *De Conditionibus* (1665), and by a remarkable philosophico-mathematical treatise, *De Arts Combinatoria* (1666). After holding political appointments under the Elector of Mainz he went to Paris in 1672, and there applied himself particularly to mathematics. He also went to England, where he was elected a member of the Royal Society, and made the acquaintance of Boyle and Newton. About this time he made his discovery of the differential calculus. The Duke of Brunswick-Lüneburg then gave him the office of councilor and a pension, and after a further stay in Paris he returned to Hanover in 1676, and entered upon the superintendence of the library. For the rest of his life he served the Brunswick family, chiefly residing at Hanover, though visiting also Berlin, Vienna, etc. Being commissioned to write the history of the ducal house of Brunswick-Lüneburg, Leibnitz went in 1687 to Vienna, and thence to Italy. The three years spent in these tours of investigation supplied him with an immense mass of political materials, portion of which appeared in several works. About this time he proposed a scheme to reunite Protestants and Catholics. Having assisted the Elector of Brandenburg (afterwards Frederick I of Prussia) to establish the Royal Academy of Sciences at Berlin, he was made president for life (1700). He was also made a privy-councilor by Emperor Peter the Great. In 1710 he published his celebrated *Essai de Théodicée*, on the goodness of God, human liberty and the origin of evil, in which he maintained the doctrines of preëstablished harmony and optimism, and which was followed by his *Nouveaux Essais sur l'Entendement Humain*. A sketch of his philosophy was given by him in his *Monadologie*, 1714. His controversy with Newton concerning the discovery of the differential calculus, with the pains of the gout, embittered the close of his active life. He died in 1716. The principal metaphysical speculations of Leibnitz are contained in his *Théodicée*, *Nouveaux Essais*, *Système nouveau de la Nature*, *De Ipsa Natura*, *Monadologie*, and in portions of his correspondence. He controverted Locke's rejection of innate ideas, holding that there are necessary truths which cannot be learned from experience, but are innate in the soul, not, indeed, actually forming objects of knowledge, but capable of being called forth by circumstances. Authorities seem generally agreed that Leibnitz discovered the differential calculus independently of any knowledge of Newton's method of fluxions, so that each of these great men in reality attained the same result for himself.

Leicester (les'tėr), a municipal and parliamentary borough of England, county town and near the center of Leicestershire, on the right bank of the Soar. The more important public buildings are the Church of All Saints; St. Margaret's, a large and beautiful structure of the fifteenth century on the site of the old Saxon cathedral, and adjoining the abbey at which Cardinal Wolsey died in 1530; St. Martin's; St. Mary's, dating from twelfth century; St. Nicholas', a very ancient Gothic church; the municipal buildings, with lofty clock-tower, and fine public square with fountain; the guild hall, the public library, etc. The staple manufactures are cotton and worsted hosiery, elastic webs, ironware, boots and shoes, shawls, lace, thread, etc. Leicester is a place of considerable antiquity, and was known to the Romans under the name of Ratæ. Its walls and strong castle were demolished in the reign of Henry II. It suffered severely during the wars of Lancaster and York, and also during the Parlia-

mentary war, having in the latter been first taken by storm by the royalists, and then retaken by the republicans. Pop. 227,242.—LEICESTERSHIRE is bounded by Nottingham, Derby, Warwick, Northampton, Rutland and Lincoln; area, 813 sq. miles, almost all arable land, meadow and pasture. The surface is varied and uneven, but possesses no bold features. The county is nearly equally divided geologically by the lias and sandstone formations; the former on the east, the latter on the west side. The coal formation exists to the extent of about 15 square miles on the west, and the clay-slate in Charnwood Forest. Dairy farms are numerous, and the cheese known as Stilton is chiefly made in Leicestershire. The Leicestershire sheep are much valued for their wool. Principal towns besides Leicester—Loughborough, Market-Harborough, Melton-Mowbray and Hinckley. Pop. (1911) 476,603.

Leicester, ROBERT DUDLEY, EARL OF, fifth son of John Dudley, Duke of Northumberland, born in 1532; died in 1588. In 1549 he was married to Amy Robsart, daughter of a Devonshire gentleman, and is said to have been accessory to her murder in 1560. Elizabeth created him Earl of Leicester and privy-councilor, and bestowed titles and estates on him lavishly. Her fondness for him caused his marriage with her to be regarded as certain. His marriage with the Countess of Essex in 1578 mortally offended her. He successfully commanded in the Low Countries, and when England was threatened by the Spanish Armada, in 1588, was appointed lieutenant-general.

Leidy (lī'de), JOSEPH, an eminent naturalist, was born in Philadelphia in 1823. In 1845 became prosector to the chair of anatomy in University of Pennsylvania, in 1853 professor, and in 1884, director of the department of biology. He was elected president of the Academy of Natural Sciences in the same year. An ardent zoologist and palæontologist, his published papers on biological subjects number over 800. Many of these had to do with microscopic forms, which he studied diligently, describing his researches in the *Fresh Water Rhizopods of North America.* Another work of value was *The Extinct Mammalian Fauna of Dakota and Nebraska.* He died in 1891.

Leigh (lē), a town of England, county of Lancaster, 7½ miles from Bolton. There are coal mines in its vicinity, and it has glassworks, textile factories, etc. Pop. (1911) 44,109.

Leighton (lā'ton), SIR FREDERICK, painter, president of the Royal Academy, born at Scarborough in 1830. At fourteen he entered the Academy of Berlin, but a year later went to Frankfort-on-Main to continue his general education. His subsequent art studies were made at Florence (1845-46),

Sir Frederick Leighton, P. R. A.

the academy at Frankfort-on-Main (1846-48), Brussels (1848-49), Paris (1850), and Frankfort again (1851-53). From Rome, where he spent some three winters, he sent to the academy of 1855 his picture of *Cimabue's Madonna carried in procession through the streets of Florence,* which called forth general admiration, and was purchased by the queen. For four subsequent years he resided at Paris, availing himself of the friendly counsel of Ary Scheffer, Robert Fleury, and other painters, and then finally took up residence in London. In 1864 he was elected an associate of the Royal Academy, and in 1869 an academician. In 1878 he succeeded Sir Francis Grant as president of the Academy, was knighted, and was named an officer of the Legion of Honor. Seven years later he was made a baronet, and he received various honors and honorary degrees. From the long list of his works special mention may be made of his *Hercules Wrestling with Death* (1871), the *Daphnephoria* (1876), the *Music Lesson* (1877), *Sister's Kiss* (1880), *Phryne* (1882), *Cymon and Iphigenia* (1884), *Captive Andromache* (1888), and *Ball Players* (1889); and the large frescoes at the South Kensington Museum, representing the Industrial Arts applied to War, and the Arts of Peace. In addition to his pictures he achieved a high place as a sculptor by his *Athlete Strangling a Python* (1876),

and his *Sluggard* (1886). The special merit of his work lies in the perfection of his draftsmanship and design, his coloring, though possessing unfailing charm of harmonious arrangement, being only thoroughly satisfactory from the decorative point of view. He had fine poetic quality, conjoined with elegance in drawing and great refinement in execution. He died in 1896.

Leighton, ROBERT, a Scotch prelate, born in Edinburgh or London in 1611. He was educated at Edinburgh University, and then spent about ten years on the continent, chiefly at Douay. On his return to Scotland in 1641 he became pastor of the parish church of Newbattle, but resigned his living in 1652, and in the following year was chosen principal of Edinburgh University. On the attempt at the accession of Charles II to establish Episcopacy in Scotland, Leighton accepted reluctantly the bishopric of Dunblane, in the hope of moderating the violent dissensions of the time. He twice visited London (1665 and 1669) to implore the king to moderate the zeal of Sharpe and Lauderdale, and accepted the archbishopric of Glasgow in 1670 only after a promise of court assistance in the attempt to carry out a liberal measure for the comprehension of the Presbyterians. The promise being broken, he resigned his see, and subsequently resided for the most part at Broadhurst, his sister's estate in Sussex. He died in London in 1684. He was celebrated for his learning, gentleness and disinterestedness. He founded exhibitions in the colleges of Edinburgh and Glasgow.

Leighton-Buzzard, a town of England, Bedfordshire, 18 miles southwest of Bedford, on the Ouse, and near the Grand Junction Canal. It carries on lacemaking and straw-plaiting. Pop. (1911) 6784.

Leiningen (līn'ing-en), a former principality of Germany, erected in 1779, and divided between Baden, Bavaria and Hesse at the Peace of Lunéville in 1801.

Leinster (lin'stėr), a province of Ireland, divided into twelve counties—Wexford, Kilkenny, Carlow, Wicklow, Dublin, Kildare, Queen's County, King's County, Westmeath, Longford, Meath and Louth; area, 7620 sq. miles. Leinster which is in the southestern part is the most favored of the four provinces of Ireland in the extent of its tillage and pasture lands and its wealth in minerals. Pop. 1,150,480.

Leipa, or LEIPPA (BÖHMISCH), (*beu'*-mish-lī'pȧ), a town of Bohemia, in the circle of Leitmeritz, 43 miles N. N. E. of Prague. Pop. 10,674.

Leipoa (lī-pō'a), a genus of gallinaceous birds of the family Megapodidæ, of which the only species is the *Leipoa ocellāta* of the naturalists, the *ngow-oo* of the aboriginal Australian, and the 'native pheasant' of the colonists. The bird is a native of Australia, is of the size of a very small turkey, and, like the Australian jungle-fowl, constructs mounds in which to lay its eggs.

Leipzig (līp'zi*h*), or LEIPSIC, the second city of the kingdom of Saxony, and one of the chief seats of commerce in Germany, 64 miles W. N. W. from Dresden. It lies in an extensive and fertile plain on the Elster, here joined by the Pleisse and Parthe, and consists of an old central or inner town and more modern and much more extensive suburbs. The marketplace in the old town has a picturesque appearance, having about it the town hall (Rathhaus), built in 1556, and other buildings in the renaissance style. It contains a fine war monument erected in 1888. The Augustus-Platz is one of the finest squares in Germany, overlooked by the university, museum, new theater, etc. The Pleissenburg or castle, now partly used as a barrack, withstood the attacks of Tilly, and is memorable as the scene of the famous Leipzig disputation between Luther and Dr. Eck in 1519. The suburbs contain the post-office buildings, the Church of St. John, the fine new Church of St. Peter and the Roman Catholic church; the Rosenthal (Valley of Roses), with pleasant wooded walks; and numerous places of recreation. The university, founded in 1409, is the second in importance in Germany (that of Berlin being first), and has over 3000 students, and a library of 350,000 vols. Schools are numerous and good, the conservatory of music being of some celebrity. Besides being the center of the book and publishing trade of Germany, Leipzig possesses considerable manufactures, and has important general commerce carried on especially through its three noted fairs at the New Year, Easter and Michaelmas. Leipzig is of Wendish origin, and dates from the eleventh century. It early received the Reformation. In 1631 Gustavus Adolphus defeated Tilly near it at Breitenfeld. It suffered much from the Seven Years' war. On October 16-19, 1813, the great 'battle of the nations' (Völkerschlacht) was fought around and in Leipzig, in which Napoleon received his first defeat. Pop. 585,743.

Leisnig (līs'ni*h*), a town of Saxony, in the circle of Leipzig and

28 miles from that city, on the left bank of the Mulde. Pop. 8147.

Leistenwein. See *Franconian Wines.*

Leitch (lēch), WILLIAM LEIGHTON, landscape painter, born at Glasgow in 1804; died in London in 1883. Commencing his career as a house painter in his native city, he removed to London early in life and practised scene painting successfully. After five years of study in Italy he settled in London, and gained celebrity as an art teacher. Among his pupils were Queen Victoria and all the members of the royal family. At the request of a deputation of influential artists he became a member of the New Society of Painters in Water-colors in 1861, and from that time was a regular contributor to the society's exhibitions, and to those of its successor, the Royal Institute of Water-color Painters. Many of his subjects are Italian and Sicilian scenery, but scenes in Scotland and elsewhere are not of infrequent occurrence. His productions (the majority of which are done in water-colors) are not numerous, but of great merit. They are distinguished by graceful composition, perfect balance of the several parts, and much power in rendering atmospheric effects. A number of them have been engraved as book illustrations and also as separate prints.

Leith (lēth), a seaport in the county of Midlothian, Scotland, about 1½ miles from the center of Edinburgh, on the south shore of the Firth of Forth, on both sides of the Water of Leith. It is connected with Edinburgh (of which it is the port) by Leith Walk and other lines of streets, and by branch lines of the railways centering in Edinburgh. Among the principal public buildings are the custom house, exchange buildings, courthouse, Trinity House, corn-exchange, etc. The chief manufactures are ropes, sail-cloth, soap, candles, paints, colors, artificial manures, and there are breweries, distilleries, shipbuilding yards, sugar refineries, iron foundries, engine-works, etc. The foreign trade is chiefly with the continent, particularly with the ports on the Baltic, and the principal French and German ports; there is also some colonial and an important coasting trade. There are extensive wet docks, and three public graving docks, capable of receiving the largest vessels. Leith is mentioned for the first time, under the name of Inverleith, in a charter of David I granted in 1128; and in 1329 a charter of Robert I made a grant of the port and mills of Leith to the city of Edinburgh. It did not obtain a separate and independent magistracy till 1832. Pop. 77,439.

Leitha, or LEYTHA (lī'tà), a river rising in Lower Austria and forming for some distance the boundary between the two divisions of the Austro-Hungarian Empire (the Cisleithan or Austrian and the Transleithan or Hungarian); afterwards passing into Hungary and joining the Danube at Altenburg.

Leitmeritz (līt'me-rits), a town of Bohemia, beautifully situated on a height above the right bank of the Elbe, 34 miles northwest of Prague. It is the see of a bishop, and contains a fine old cathedral. Pop. 13,075.

Leitrim (lē'trim), a county of Ireland, in Connaught, touching Donegal Bay on the north. Area, 613 sq. miles. A considerable portion of its western boundary is formed by the Shannon, which first flows through Lough Allen, a lake situated near the center of the county, and almost cutting it in two. The surface in the north is somewhat rugged and mountainous, but elsewhere generally flat and in part moorish. In the valleys the soil, resting generally on limestone, is fertile. The principal crops are oats and potatoes. The minerals include iron, lead and copper, all at one time worked, and coal, still raised to some extent. County town, Carrick-on-Shannon. Pop. 69,343.

Leland (lē'land), CHARLES GODFREY, author, born at Philadelphia in 1824; studied law, but abandoned it for a literary life. He is best known through his quaint *Hans Breitmann Ballads* in Pennsylvania Dutch dialect, and his works on the language and poetry of the Gypsies. He died in 1903.

Leland, or LAYLONDE, JOHN, an English antiquary, born in London about 1500, educated at St. Paul's School, and Christ's College, Cambridge, afterwards studying at Oxford and at Paris. On his return Henry VIII made him his chaplain and librarian, and gave him the title of royal antiquary. In 1533 he was empowered, by a commission under the great seal, to search for objects of antiquity in the archives and libraries of all cathedrals, abbeys, priories, etc., and having spent six years in traveling for this purpose, he retired to his house in London to arrange and methodize the mass of historical material acquired. He died insane, however, in 1552, without having completed his task. The great bulk of his collections was ultimately placed in the Bodleian Library in an indigested state. Hearne printed a considerable part, forming the *Itinerary of John Leland* and *Lelandi Antiquarii de*

LELAND STANFORD JUNIOR UNIVERSITY, PALO ALTO, CALIFORNIA

Founded in 1885 by Leland Stanford and his wife Jane Lathrop Stanford as a memorial to their son, Leland Stanford, Jr.

Rebus Britannicis Commentarii. His collections have been sedulously mined by subsequent antiquaries.

Leland, JOHN, an English Presbyterian divine, born at Wigan in 1691. Early in life he became the pastor of a Dissenting congregation in Dublin, and remained there till his death in 1766. He acquired considerable reputation by his *View of the Deistical Writers that have appeared in England in the Last and Present Century* (1754-56).

Leland Stanford, Jr., University, a co-educational, non-sectarian institution at Palo Alto, California. It was founded in 1891 by Leland Stanford and his wife in memory of their son, who died in 1884. The endowment is $18,000,000. It has about 200 instructors and 1700 students.

Lely (lē'li), SIR PETER, painter, born at Soest, in Westphalia, in 1617 or 1618. Lely or Le Lys was properly a nickname borne by his father, whose family name was Van der Taes. He was first instructed by Peter Grebber at Haarlem, but went to England in 1641, and commenced portrait painting. He finished portraits both of Charles I and of Cromwell; but it was not until the Restoration that he rose to the height of his fame. He fell in with the voluptuous taste of the new court, and was in great favor with Charles II, who knighted him. He died in 1680. The Hampton Court Collection of portraits of the ladies of the court of Charles II contains some of his best work; the finest of his few historical works being the *Susannah and the Elders*, at Burleigh House.

Le Maître (leh-matr), JULES, a French critic and poet, born at Vennecy in 1853. He became professor of rhetoric at Havre in 1875 and of literature at Grenoble in 1884, and was made a member of the French Academy in 1895. He became famous as a dramatic critic, and wrote *Les Contemporains*, *Dix Contes*, *Les Bois*, etc., and a number of plays.

Leman (lē'man), LAKE, a name sometimes given to the Lake of Geneva. See *Geneva, Lake of.*

Lemberg (lem'berg; Polish, *Lwow*), a city of Austria, capital of the Kingdom of Galicia, on the Peltew, 468, miles N. W. of Vienna. Though founded in the thirteenth century, it has all the appearance of a modern town from its rapid increase in recent times. Besides being the seat of the government, and the important courts and public offices necessarily connected with it, it possesses three metropolitan sees—Greek, Armenian and Roman Catholic. It has a university (library 86,000 volumes), attended by about 1400 students; and the Ossolinsk Literary Institute (library 78,000 volumes). The manufactures are extensive and varied, and there is a large trade, which is very much in the hands of the Jews, who here number more than 30,000. Pop. 159,618.

Lemma (lem'a), in mathematics, a preliminary proposition, laid down in order to clear the way for some following demonstration, and prefixed either to theorems, in order to render their demonstration less perplexed and intricate, or to problems, to make their solution more easy and short.

Lemming (lem'ing), a rodent mammal very nearly allied to the mouse and rat. There are several species, found in Norway, Lapland, Siberia, and the northern parts of America. The most noted species is the common or

Common Lemming (*Myōdes Lemmus*).

European lemming (*Myōdes Lemmus*), of which the body color is brownish variegated with black; the sides of the head and belly white, or of a grayish tint. The legs and tail are of a gray color. The head is large and shortened, the body thick-set, and the limbs stout. It feeds on plants, and is exceedingly destructive to vegetables and crops. It burrows under the ground at a limited depth. It is very prolific, and vast hordes sometimes migrate towards the Atlantic and the Gulf of Bothnia, destroying all vegetation in their path. Great numbers of wild animals—bears, wolves, foxes—hang upon them in their march, making them their prey, thus tending to keep their numbers in some degree in check. Many of them are drowned in the sea.

Lemna. See *Duck-weed.*

Lemnian Earth (lem'ni-an), a kind of astringent medicinal earth, of a fatty consistence and reddish color, used in the same cases as bole. It removes impurities like soap. It was originally found in Lemnos, but occurs also in Bohemia, Russia and India, resulting from decay of felspathic rocks,

like kaolin, to which it is related. Called also *Sphragide*.

Lemniscata (lem-nis-ka'ta), or LEMNISCATE, in geometry, the name given to a curve having the form of the figure 8, with both parts symmetrical.

Lemnos (lem'nos; Italian *Stalimene*), the most northerly island of the Grecian Archipelago, between the Hellespont and Mount Athos. It has an area of 147 square miles, and abounds in vines, wheat, etc. The principal town on the island is Limno, or Kastro. Lemnos formerly contained a volcano, Mosychlus, which was regarded as the workshop of Hephaistos (Vulcan). Pop. about 30,000.

Lemoine (lė-mwȧn), FRANÇOIS, a French historical painter, born in 1688. In 1718 he became a member of the Academy, and on his return from a visit to Italy in 1723 was appointed professor at the Academy. He painted the chapel of the Holy Virgin in the Church of St. Sulpice, and subsequently the ceiling in the Hall of Hercules at Versailles, a painting 64 feet long and 54 broad, which occupied him seven years. In a fit of insanity he put an end to his life in 1737.

Lemon (lem'un), the fruit of the lemon tree (*Citrus Limonum*), originally brought from the tropical parts of Asia, but now cultivated very extensively in the south of Europe, especially in Sicily. It is congeneric with the orange and citron, and belongs to the natural order Aurantiaceæ. It is a knotty-wooded tree of rather irregular growth, about 8 feet high; the leaves are oval, and contain scattered glands which are filled with a volatile oil. The shape of the fruit is oblong, and its internal structure is similar to that of the orange. The juice is acid and agreeable; and in addition to its use in beverages is employed by calico-printers to discharge colors. As expressed from the ripe fruit it has a specific gravity of 1.04, and contains about 1.5 per cent. of citric acid. It also contains sugar, albuminous and vegetable matters, and some mineral matter, nearly half of which consists of potash. The *oil of lemon* is a volatile oil of yellow or greenish color got from the fresh rind of the lemon. It is used in perfumery, and in medicine as a stimulant and rubefacient; it also forms an ingredient of syrup of lemon and tincture of lemon.

Lemon, MARK, humorist and dramatic writer, born in London in 1809. He made his first literary essays in the lighter drama, supplying the London stage with more than sixty pieces, farces, melodramas and comedies. On the establishment of *Punch* in 1841 he became joint-editor with Henry Mayhew, and two years later sole editor. He was also the literary editor of the *Illustrated London News*, and an occasional writer for Dickens' *Household Words*, *Once-a-Week*, and other periodicals. Among his later productions are some novels of average merit. He died in 1870.

Lemonade (lem'un-ād), a drink made of water, sugar and the juice of lemons. A good recipe is: two sliced lemons, 2½ oz. of sugar, boiling water, 1½ pints; mix, cover up the vessel, let it stand, with occasional stirring, till cold, then strain off the liquid. Aerated bottled lemonade may be prepared by putting lemon syrup into a bottle, and filling up with aerated water at a bottling machine.

Lemon-kali, a name sometimes given to the effervescing beverage formed by mixing lemon-juice with dissolved bicarbonate of potash.

Lemons, SALT OF, acid potassium oxalate, called also *salt of sorrel*.

Lempriere (lem'pri-ār), JOHN, a native of the island of Jersey, born about 1750, was graduated at Oxford as A.M. in 1792, in which year he became head-master of Abingdon grammar school. He was afterwards master of the free grammar school at Exeter. In 1811 he was presented to the rectory of Meeth, Devonshire, which living, together with that of Newton Petrock, in the same county, he held till his death. His *Classical Dictionary*, published in 1792, was of great value in its day. Among his other works was a *Universal Biography*, published in 1808. He died in 1824.

Lemur (lē'mur), a name popularly given to any member of the Lemuroida, a suborder of the Quadrumana or Monkeys, but more strictly confined to members of the family Lemuridæ. Their zoological position has been a matter of considerable debate, as they possess characteristics which distinguish them from the monkeys, and ally them with the insectivores and rodents. The simplest classification places them, however, with the lower Quadrumana. The Lemuridæ or True Lemurs are specially distinguished by the habitually four-footed or quadrupedal mode of progression. The tail (except in the short-tailed Indris) is elongated and furry, but is never prehensile. The hind limbs are longer than the forelimbs; the second toe in the hind foot being long and claw-like, and the nails of all the other toes being flat. The fourth digit of the hand, and especially of the foot, is longer than the others. The thumb can always be

opposed to the other fingers, and has a broad, flattened nail. The ears are small and the eyes large. The incisor teeth are generally four, the canines two, and the molars twelve in each jaw. The true lemurs are exclusively confined to Madagascar and neighboring islands, but other members of the family are found in Africa and as far east as the Philippines. They are all arboreal in their habits, and subsist chiefly upon a vegetable diet, but also eat insects, and the smaller birds and their eggs.

Red Lemur (*Lemur ruber*).

Lemures (lem'ū-rēz), among the ancient Romans, the name given to the ghosts or souls of the dead. In order to appease them a ceremony called *lemuria* was observed on the nights of May the 9th, 11th and 13th.

Lemuria (le-mū'ri-a), a hypothetical continent supposed by some, to have at one time extended from Madagascar and S. Africa across what is now the Indian Ocean to the Asiatic Archipelago; named from its corresponding with the habitat of the lemurs.

Lemuroida. See *Lemur*.

Lena (lē'nȧ), a river of Siberia, one of the largest in the world, rising on the northwestern side of the mountains which skirt the western shore of Lake Baikal, about 70 miles E. N. E. of Irkutsk. It flows in a winding course, and discharges itself through several branches into the Arctic Ocean in lat. 73° N., and lon. about 128° E. Its course, windings, included, is about 2770 miles.

Lenclos (lȧṇ-klō), ANNE, a notorious Frenchwoman, better known as *Ninon de Lenclos*, born at Paris in 1615 or 1616; died in 1705. Notwithstanding her reputation for gallantry, the most respectable ladies of the time, such as La Fayette, La Sablière and Maintenon, cultivated her friendship, and in her old age her house was the rendezvous of the most distinguished personages of the city and court. Scarron consulted her on his romances, St. Evremond on his poems, Molière on his comedies, Fontenelle on his dialogues and La Rochefoucauld on his maxims. Richelieu is said to have been her first lover, and Coligny, Condé, Sévigné, etc., were her lovers and friends. She retained the charms of her manners and conversation, and to some extent of her person, to extreme old age. Certain spurious letters pass under her name.

Lenkoran (len-kō-rän'), a Russian town and harbor on the Caspian Sea near Baku. Pop. 8768.

Lennep (len'ep), a town of Prussia, province of Rheinland, 21 miles E. S. E. of Düsseldorf, with worsted and woolen manufactures. Pop. 10,323.

Lennep, JACOB VAN, a Dutch novelist, historian and dramatist, born in 1802; died in 1868. He was a successful advocate, and was attorney-general for North Holland. In literature he was representative of the romantic movement in Holland. He left upwards of thirty plays, a collection of poems, and several historical works, but is perhaps best known by his historical romances, *De Roos van Dekama*, *Klaasje Zevenster*, etc.

Lenni-Lenape (len'i len'a-pē), the name by which the Delaware Indians called themselves. See *Delaware*.

Lennox (len'oks), CHARLOTTE RAMSAY, novelist, was born in New York in 1720, but lived from the age of fifteen in London, where she died in 1804. She was friendly with Richardson and Johnson, who is said to have written the last chapter of the *Female Quixote* (1752), the best known of her works. Her other works included *Shakespere Illustrated* (1753-54), a collection of the tales used by Shakespere for his dramas, a translation of *Sully's Memoirs*, *Henrietta* (1758), *Philander* (1758), and *Sophia* (1763).

Lenormant (lė-nor-mäṇ), CHARLES, a French archæologist, born in 1802; in 1825 made inspector of fine arts. He accompanied Champollion to Egypt in 1828, and afterwards became chief of the section of fine arts at the ministry of the interior, professor at the Sorbonne, and professor of Egyptian archæology at the College of France. He left a considerable number of treatises in various departments of archæological research. He died in 1859.

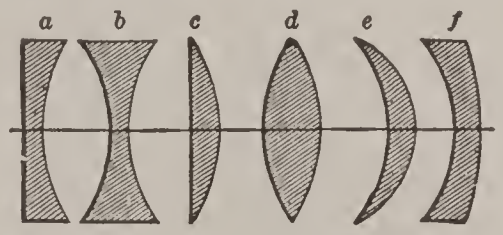
Lenormant, FRANÇOIS, a French archæologist, born in 1837; son of Charles Lenormant. After traveling in the East he became, in 1874,

professor of archæology at the Bibliothèque Nationale. He died in 1883. He was an authority on the Cuneiform inscriptions and the Accadian language.

Lenox (len'okz), JAMES, philanthropist, born in New York city, in 1800. From his father he inherited several millions of dollars. For half a century his time was devoted to the forming of a library and gallery of paintings, which he conveyed to New York city in 1870, the total value being over $2,000,000. He was a liberal donor to many churches and charities. He died in 1880.

Lenôtre (lė-nōtr), ANDRÉ, a French architect and ornamental gardener, born in 1613. His plans for the decoration of the park of Versailles contributed principally to establish his reputation. He afterwards embellished the gardens of Trianon, Chantilly, St. Cloud, Sceaux, the Tuileries, etc. Louis XIV in 1675 bestowed on him letters of nobility. He died in 1700. His style of ornamental planting was fashionable in Britain, till it was superseded by the designs of Kent, Brown, and the modern landscape gardeners.

Lens, a transparent substance, usually glass, so formed that rays of light passing through it are made to change their direction, and to magnify or diminish objects at a certain distance.



SECTIONS OF LENSES.

a, Plano-concave. *b*, Double concave.
c, Plano-convex. *d*, Double convex.
e, Meniscus. *f*. Concavo convex.

Lenses are double convex, or convex on both sides; double concave, or concave on both sides; plano-convex, or plano-concave, that is, with one side plane and the other convex or concave, or convex on one side and concave on the other. If the convexity be greater than the concavity, or if the two surfaces would meet if produced, the lens is called a *meniscus;* and if the concavity be greater than the convexity, the lens is termed *concavo-convex.* See *Optics, Microscope, Telescope.*

Lent, the forty days' fast in spring, beginning with Ash Wednesday and ending with Easter Sunday. In the Latin Church Lent formerly lasted but thirty-six days; in the fifth century four days were added, in imitation of the forty day's fast of the Saviour, and this usage became general in the Western Church. The close of Lent is celebrated in Roman Catholic countries with great rejoicings, and the carnival is held just before it begins. The English Church has retained Lent and many other fasts, but gives no directions respecting abstinence from food.

Lentibulariaceæ (len-tib-yu-la-ri-ā'-ce-ē), a small nat. order of monopetalous exogens, growing in water or in marshy places, sometimes epiphytes. The flowers (often large and handsome) are usually yellow, violet, or blue. There are four genera, of which *Utricularia* (bladderwort) and *Pinguicula* (butterwort) are the best known.

Lentil (len'til; *Ervum lens*), a plant belonging to the papilionaceous division of the nat. order Leguminosæ, cultivated in Southern and Central Europe. It is an annual, rising with weak stalks about 18 inches, and with whitish flowers hanging from the axils of the

Lentil (*Ervum lens*).

leaves. Two varieties are cultivated—the large *garden lentil* and the common *field lentil*—the former distinguished by its size and the greater quantity of mealy substance which it will afford. The straw of lentils makes good fodder. As food for man the seeds are very nutritious, and in Egypt, Syria, etc., are a chief article of diet. In Great Britain their use for food has increased of late years, and it is to them that the foods advertised as *revalenta* or *ervalenta* owe their name. They are also coming into use in United States.

Lentini (lēn-tē′nē), a town of Sicily, province of Syracuse. It has interesting ruins, and enjoys a considerable trade. Pop. 11,134.

Lentiscus (len-tis′kus), or LENTISK, the mastich tree Pistacia *lentiscus*), a tree of the nat. order Anacardiaceæ, a native of Arabia, Persia, Syria and the south of Europe. The wood is of a pale brown, and resinous and fragrant. See *Mastic.*

Lento (len′tō; Italian, *slow*), a term used in music; rather faster than adagio.

Leo (lē′ō), the Lion, the fifth sign of the zodiac, between Cancer and Virgo. The sun enters it about July 22, and leaves it about August 23. The constellation contains 95 stars, and is noteworthy for its remarkable nebulæ. There is also a constellation of the northern hemisphere known as Leo Minor, and containing 53 stars.

Leo I, ST. LEO, called *the Great*, pope, born about 390. The Popes Celestine I and Sixtus III employed him in important ecclesiastical affairs, and on the death of Sixtus III in 440 he was elevated to the papal chair. The beginning of his pontificate was marked by condemnation of all holding the Manichean, Pelagian, Priscillian and Eutychean heresies. He was employed by Valentinian to intercede for peace with Attila, who, at his request, evacuated Italy. From the Vandal Genseric, however, he was unable to obtain more than the promise to forbid the murder of the citizens, the burning of the city, and the plunder of the three principal churches in Rome. His death took place in 461. He is the first pope whose writings—sermons, letters, etc.—have been preserved. In his earnest effort to keep the Archbishop of Constantinople from having himself declared primate of the East at the Council of Chalcedon in 451, he was defeated by the ambition of that prelate and the emperor.

Leo III, a Roman by birth, elected pope on the death of Adrian I in 795. He commenced his rule by making submission to Charlemagne, so that when driven from Rome in 799 by his rival Paschal, Charlemagne reëstablished him on his throne, receiving from him in 800 the imperial crown. Leo died in 816.

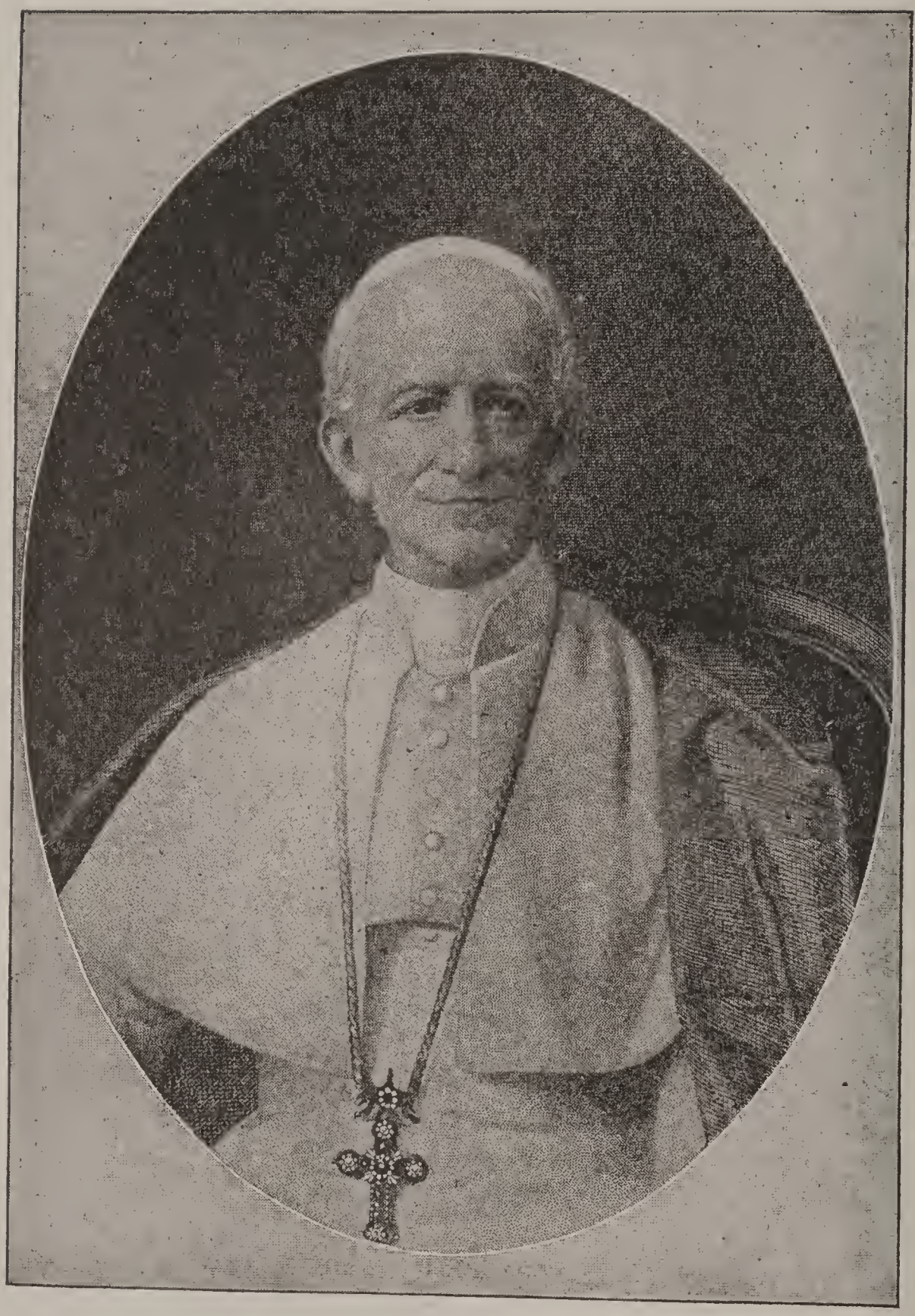
Leo X, GIOVANNI DE MEDICI, second son of Lorenzo the Magnificent, born at Florence in 1475, received the tonsure in his seventh year, and was loaded with benefices. In 1488, when only thirteen years old, he was made a cardinal, and in 1492 took his seat as a member of the Holy College at Rome. Pope Julius II made him governor of Perugia, and in 1511 placed him, with the title of Legate of Bologna, at the head of his forces in the holy league against France. He was made prisoner by the French at the battle of Ravenna in 1512, but soon after regained his freedom and returned to Bologna, where he conducted the government as legate. After contributing to the reëstablishment of the Medici he remained at Florence until the death of Julius II recalled him to Rome. Although only a deacon, he was chosen to succeed Julius in 1513. He made a favorable peace with Louis XII, who was compelled to abandon Italy, and public tranquillity being thus restored in the first year of his government, he gave all his attention to the promotion of literature and the arts. The university at Rome was restored and endowed; a society established for the publication of Greek authors, and great encouragement given to scholars. In 1515 he had an interview with Francis I at Bologna, and formed with him a concordat, which remained in force nearly three hundred years, and gave to the king the right to nominate bishops in his own dominions. To procure money, particularly for the completion of St. Peter's, he encouraged the sale of indulgences, an abuse which incidentally promoted the Reformation, in calling forth the attacks of Luther. Leo died suddenly in 1521.

Leo XIII, born JOACHIM PECCI, in 1810, at Carpineto, Italy. He became a chaplain of Gregory XVI in 1837, bishop of Daniretta in 1843, archbishop, and bishop of Perugia in 1846, and was made a cardinal priest in 1853 by Pius IX, whom he succeeded as pope in 1878. As such he was opposed to radical measures and extreme views, though he strongly held for the temporal dominion of the papacy. He died in 1903.

Leoben (lā-ō′ben), a town of Austria, in Styria, 44 miles N. N. W. of Gratz, on the right bank of the Mur. Pop. 10,204.

Leominster (l e m′ s t ė r or lem′in-stėr), an old municipal borough and market town of England, county of Hereford, 12 miles north of Hereford, in a fertile valley on the right bank of the Lugg. The spacious priory church (restored and enlarged in 1866 and 1879) exhibits fine specimens of Norman and early English architecture. Leather glovemaking is the chief industry. Pop. (1911) 5737.

Leominster (lem′in-stėr), a town of Worcester County, Mas-



LEO XIII

The above portrait of Leo XIII is a copy of one selected by His Holiness from his own cabinet.

sachusetts, on the Nashua River, 40 miles W. N. W. of Boston. It is the center of the comb manufacture of the state; also produces paper, pianos, buttons, jewelry and toys. Pop. 17,580.

Leon (lā-ōn′), one of the old divisions of Spain, formerly a kingdom, is bounded north by Asturias. east by Old Castile, south by Estremadura, and west by Portugal and Galicia. It is now divided into the provinces of Leon, Zamora and Salamanca.

Leon, a city of Spain, capital of the province and ancient kingdom of the same name, 176 miles northwest of Madrid. It is for the most part in a somewhat decayed condition. The principal edifices are the cathedral, a beautiful specimen of the purest Gothic; the Church of San Isidoro, an ancient massive structure; and the fine old palace, called La Casa de los Guzmanes. Pop. 15,580. —The province has the Asturias as its northern boundary, a branch of which mountains divides it into two portions. The western portion is adapted rather for pasture than tillage, but the eastern has wide and undulating plains, on which the vine and various grain crops are successfully cultivated. Area, 5986 square miles. Pop. 386,083.

Leon, a town of Central America, capital of the department of Leon, state of Nicaragua, on a large and fertile plain near the Pacific coast. It is regularly built, and the public buildings, which are considered among the finest in Central America, include a massive cathedral, an old episcopal palace, a new episcopal palace, and several churches. A railway connects it with the coast at Corinto. The town has suffered a good deal from the civil wars. Pop. about 45.000.

Leon, a city of Mexico, State of Gûanajuato, on a fertile plain more than 6000 feet above sea-level, a well-built place, with flourishing industries of various kinds, which its railway connections are helping to develop. It is one of the most thriving towns of Mexico. Pop. 64,620.

Leon, a province of Central Ecuador, area 2590 square miles. In its N. E. portion is the volcano of Cotopaxi. Pop. about 125,000.

Leonardo da Vinci. See *Vinci.*

Leonard's, St. See *Hastings.*

Leonforte (lā-ōn-fōr′tā), a town of Sicily, in the province of Catania, and 37 miles W. N. W. of Catania. It carries on a considerable trade in corn, wine and silk. Pop. 16,004.

Leonidas (le-on′i-das), in Greek history, a king of Sparta, who ascended the throne 491 B.C. When Xerxes invaded Greece, the Greek congress assigned to Leonidas the command of the force destined to defend the pass of Thermopylæ. His force, according to Herodotus, amounted to over 5000 men, of whom 300 were Spartans. After the Persians had made several vain attempts to force the pass, a Greek named Ephialtes betrayed to them a mountain path by which Leonidas was assailed from the rear, and he and his followers fell after a desperate resistance (B.C. 480).

Leonine Verse (lē′u-nīn), a kind of Latin verse, in vogue in the middle ages, consisting of hexameters and pentameters, of which the final and middle syllables rhyme; so called from Leo or Leonius, a poet of the twelfth century, who made use of it. The following distich may serve as an example, being the Latin version of 'The devil was sick,' etc.:

'Dæmon languebat, monachus tunc esse volebat;
Ast ubi convaluit, mansit ut ante fuit.'

Leontodon (lē-on′to-don). See *Dandelion.* But dandelion is often put in a separate genus, *Taraxacum* (being called *T. officināle* or *T. dens-leonis*), certain allied plants being assigned to *Leontodon.*

Leopard (lep′ard; *Felis leopardus*), a carnivorous mammal inhabiting Africa, Persia, India, China, etc., by some regarded as identical with the panther. The ground or general body-color of both is a yellowish fawn, which

Leopard (*Felis leopardus*).

is slightly paler on the sides, and becomes white under the body. Both are also marked with black spots of various sizes, irregularly dispersed, a number of them being ring-shaped. The African animal seems to have these ring-spots chiefly on the back, and to this form some would specially assign the name of leopard. It

preys upon antelopes, monkeys, and the smaller quadrupeds, rarely attacking man unless itself attacked. It can ascend trees with great ease, often using them both for refuge and ambush. It is not infrequently trapped by means of pitfalls. Besides the common leopard there is also a useful and docile Asiatic species, the chetah or hunting leopard (*Felis jubāta*). See *Chetah.*

Leopardi (lā-o-par'dē), GIACOMO, COUNT, an Italian poet and scholar, born in 1798. He conducted his own education, and at an early age he had written a *History of Astronomy*, and translated, with learned notes, Porphyry's *Life of Plotinus.* He also translated into Italian verse the *Battle of the Frogs and Mice*, some fragments of the *Odyssey*, etc. A commentary on Petrarch, and an essay on the errors of the ancients, appeared in 1815; and in 1818-20 an ode to Italy and other poems raised him to the first rank of lyric poets. He lived at various times in Rome, Milan, Bologna, Florence, almost constantly a victim of ill health; in 1833 he removed to Naples, where he died in 1837.

Leopard's-bane, *Doronicum pardalianches*, nat. order Compositæ, a robust plant, with large, roughish leaves and conspicuous, yellow flower-heads.

Leopard-wood, the wood of *Brosimum Aublettii*, a tree of Trinidad and Guiana, allied to the cow tree.

Leopold I (lē'u-pōld), King of the Belgians, son of a Duke of Saxe-Coburg, was born in 1790. In 1816 he married the Princess Charlotte, heir-apparent of Great Britain, who died in 1817. In 1831 he accepted the crown of Belgium. He married a daughter of King Louis Philippe of France. He was popular among his subjects, being liberal and attentive to their constitutional rights. He died in 1865.

Leopold II, King of the Belgians, was born in 1835, and succeeded his father, Leopold I, in 1865. As Duke of Brabant, he had been an active legislator before his accession. Queen Charlotte, his wife, was a niece of Francis Joseph of Austria. During his reign Belgium became the administrator of the Congo Free State, and Leopold its sovereign. He was accused of working the natives cruelly in his own interests and of growing wealthy from the fruits of their enforced labor. He surrendered his sovereignty over this state to the government of Belgium in 1907, and died in December, 1909, being succeeded by his son Albert.

Leopold I. See *Germany.*

Lepadidæ (le-pad'i-dē), the barnacles or goose-mussels, a family of cirriped crustaceans, free-swimming when in the larval state, but when adult attached by the antennæ to submarine bodies. See *Barnacle.*

Lepanto (lē-pan'tō), or EPAKTO (ancient *Naupactus*), a seaport town of Greece, in the nome of Phokis, on the Gulf of Corinth or Lepanto, near the Strait of Lepanto. Its harbor is now silted up, but it was anciently of considerable importance. It is memorable for the naval battle, from which dated the decline of the Turkish power in Europe, fought within the gulf on October 7, 1571, between the Ottoman fleet and the combined fleets of the Christian states of the Mediterranean, under Don John of Austria, when the former, consisting of 200 galleys and 60 other vessels, was destroyed.—The strait connects the Gulf of Corinth with the Gulf of Patras, and is about 1 mile wide at its narrowest part.

Lepas (lep'as), the generic name of barnacles. See *Lepadidæ* and *Barnacle.*

Leper. See *Leprosy.*

Leper-houses (lep'ėr), houses for the treatment of leprosy; once very numerous in England, nearly every important town having one or more of these houses. The house of Burton Lazars in Leicestershire, built by a general subscription raised over England in the time of King Stephen, was the head of all lazar-houses in England. It was dependent on the leper-house at Jerusalem. From the Crusades until the Reformation these houses flourished and multiplied. Gradually, however, as better habits and treatment began to diminish diseases of the class for which they were used, these houses declined, and were abandoned or appropriated to other objects.

Lepidodendron Sternbergii.

Lepidium (lep-id'i-um), an extensive genus of herbs or undershrubs of the nat. order Cruciferæ. *L. satīvum* is the common garden-cress.

Lepidodendron (lep-i-dō-den'dron; Greek *lepis*, scale, and *dendron*, tree), a genus of fossil plants, cryptogamic and acrogenous. The stalks are dichotomous, the leaves simple, linear, or

lanceolate, but only towards the extremity. Their internal structure is intermediate between that of the Coniferæ and Lycopodiaceæ. They are found only in the coal-measures. Some of the species were of immense size, fragments of stems being found upwards of 40 feet in length.

Lepidoganoidei (lep-i-dō-ga-noi'de-ī), a suborder of ganoid fishes, distinguished from the placoganoid fishes by their external covering consisting of scales, and not, as in the latter, of plates. The best-known living fishes belonging to the Lepidoganoidei are the bony pike and the polypterus.

Lepidolite (le-pid'o-līt), or Lithia Mica, a species of mica occurring in oblique rhombic or hexagonal prisms, or in masses composed of small, crystalline scales. Its color is pink or peach-blossom, passing into gray; luster pearly; easily split into thin, translucent, flexible scales or plates. The mineral is one of the principal sources of the metal lithium.

Lepidoptera (lep-i-dop'te-ra; Greek, *lepis*, a scale; *pteron*, a wing), the scientific name of the order of insects which includes the butterflies and moths (which see), and which is so named from the presence of innumerable small, membranous scales, which come off like fine dust or powder when the wings (four in number) are touched by the finger. The scales are merely modifications of the hairs with which the wings of most other insects are covered; and from the presence of these scales the beautiful tints and colors of the lepidopterous insects are derived. The Butterflies form the *diurnal* Lepidoptera; while the Moths, flying about chiefly at twilight or during the night, are termed *crepuscular* or *nocturnal* Lepidoptera.

Lepidoptera.

1, Butterfly—*Hipparchia galathea*, marbled white butterfly. 2, Hawk-moth or sphinx—*Macroglossa stellatarum*, humming-bird hawk-moth. 3, Moth—*Abraxas grossulariata*, magpie moth. 4, Palpi and spiral mouth of butterfly. 5, Antennæ—*a*, Butterfly's; *b*, Sphinx's; *c*, Moth's. 6, Portion of wing of cabbage-butterfly, with part of the scales removed. 7, Scales of same, magnified.

Lepidosiren (lep-i-dō-sī'ren), the scientific appellation of the mud-fishes. See *Dipnoi*.

Lepidosteus (lep-i-dos'te-us), the generic name of the bony pike of the North American lakes. See *Bony Pike*.

Lepidus (lep'i-dus), M. Æmilius, a Roman triumvir, prætor B. C. 49, consul with Julius Cæsar in 46, and in 44 appointed by Cæsar to the government of Narbonese Gaul and Nearer Spain. He was in Rome at the time of Cæsar's death, and joined Mark Antony. In 43 he united with Antony and Octavianus to form the triumvirate, obtaining Spain and Narbonese Gaul as his share in their division of the empire. After the battle of Philippi (42) a redivision took place, in which Lepidus received Africa, where he remained till 36, when he was summoned by Augustus to assist him against Sextus Pompey. He then tried to seize Sicily, but was overcome by Augustus, who removed him from the triumvirate, and banished him to Circeii, where he lived under strict surveillance. He died in B.C. 13.

Lepismidæ (lep-is'mi-dē), a family of minute wingless insects belonging to the order Thysanura, having the abdomen furnished at its extremity with three caudal bristles, which are used in leaping. The common species (*Lepisma saccharina*) is found under wet planks or in similar damp situations.

Leporidæ (lep'or-i-dē), the hare tribe, or the family of rodents of which the genus *Lepus* is the type.

Leprosy (lep'ro-si; Greek, *lepros*, rough), a name applied at one time to several different skin diseases characterized by roughness or scaliness. True leprosy is the elephantiasis of the Greeks, the lepra of the Arabs, whose old English name was the *myckle ail* or great disease. It is to be distinguished from the elephantiasis of the Arabs, which is a local overgrowth of skin and subcutaneous tissue. There are several well-marked types. The first is characterized by the formation of nodules or tubercles in the skin, common about the eyebrows, where they destroy the hair, and produce a frowning or leonine aspect. After a time the nodules break down, forming ulcers, which discharge for a time, and may cause extensive destruction and de-

formity. The tubercles may form in the nostrils; in the throat, altering the voice; on the eyelids, extending into and destroying the eyeball. In the second type the chief features are insensibility and numbness of parts of the skin, accompanied by deep-seated pains, causing sleeplessness and restlessness. In a third variety much mutilation occurs owing to the loss of bones, chiefly of the limbs, a portion of a limb being frequently lopped off painlessly at a joint. All these varieties begin with the appearance on the skin of blotches of a dull coppery or purplish tint, the affected part being thickened, puffy and coarse looking. When the redness disappears a stain is left, or a white blotch. Leprosy is now believed to be caused by a minute organism—a bacillus (see *Germ Theory of Disease*), and to be contagious. Though the disease is not so widespread as at one time it was, it still prevails in Norway and Iceland, the coasts of the Black Sea and Mediterranean, in Madagascar, Mauritius, Madeira, the Greek Archipelago, East and West Indies, Palestine, the Pacific Islands, etc. In Hawaii an island is set aside expressly for the residence of lepers, they being removed thither as soon as the disease appears.

Lepsius (lep'se-us), KARL RICHARD, a distinguished German Egyptologist, born in 1810; died in 1884. After studying at Leipzig, Göttingen and Berlin, he carried on studies and researches at Paris, Rome and London, and he also made two visits to Egypt. He was professor in the Berlin University, director of the Egyptian section of the royal museum, director of the royal institute, head of the royal library, etc. He was author of a large number of important works on Egyptian subjects.

Leptocardia (lep-to-kar'dē-a), Müller's name for the lowest order of fishes, represented by the lancelet, now called Pharyngobranchii.

Lepus (lep'us), the genus of rodents which comprises the hares and the rabbits.

Lerici (lā'ri-chē), a seaport of Northern Italy, in the province of Genoa, on the eastern shore of the Gulf of Spezzia, 57 miles E. S. E. of Genoa. Pop. 9326.

Lérida (lā'rē-thå; ancient *Ilerda*), town of Spain, province of Lerida, Catalonia, on the right bank of the Segre, here crossed by a handsome bridge of seven arches, 84 miles W. N. W. of Barcelona. As the key of Aragon and Catalonia it was early fortified, and still continues to be one of the most important military points in Spain. It was long the seat of a university; has manufactures of textiles, glass, etc. Pop. 21,432.—The province, bounded north by France, has an area of 4690 square miles traversed by ramifications of the Pyrenees. Pop. 274,590.

Lérins (lā-raṇ), THE, several small islands off the south coast of France. The largest, St. Marguerite, is occupied by a prison, especially famous as the residence for twelve years of the Man in the Iron Mask. The second, St. Honorat, contains the ruins of a once celebrated monastery.

Lerma (lėr'ma), FRANCISCO GOMEZ DE SANDOVAL Y ROJAS, DUKE OF, born about 1550, Spanish minister under Philip III from 1598 to 1618. His career was chiefly marked by the unfavorable terms on which he concluded peace with England (1604) and the United Provinces (1608); and by the decree of proscription issued in 1609, which drove thousands of Moorish families from Spain and confiscated much of their property. Under Philip IV his administration of the treasury was challenged, and he was compelled to refund considerable sums. He died in 1625.

Lermontoff (ler'mon-tof), MICHAEL, a Russian poet, born in 1814; killed in a duel in 1841. He was for a time an imperial page, and then an officer of the guard. His first important poem, on the death of Pushkin, caused his temporary banishment to the Caucasus. His poems, which include *The Novice*, *The Demon*, *Ismail Bey*, etc., belong to the Byronic school.

Lernæadæ (ler-nē'a-dē), a group of parasitic suctorial crustaceans, of the order Ichthyophthira or fishlice, having the mouth armed with piercing mandibles, and found attached to fishes. The young lernæan as it first comes from the egg is provided with eyes, antennæ and locomotive limbs, but the limbs, eyes and other organs of sense disappear when it assumes the parasitic condition.

Lero (lē'ro; ancient, Leros), a Turkish island in the Ægean, off the coast of Asia Minor, 35 miles south of Samos; length 6 miles, width 4 miles; pop. 3000.

Leroux (lė-rö), PIERRE, a writer on social and economic questions, born at Paris in 1798. For some time his journal, the *Globe*, was an important Saint-Simonian organ, but he afterwards withdrew from that body. He was editor of the *Revue Encyclopédique* (1832), and part editor of the *New Encyclopedia* (1838). He was afterwards associated with Biardot and George Sand

in founding the *Revue Independante* (1841), and sat in the National Assembly (1848) as an extreme radical. From 1851 to 1869 he lived in Jersey and Switzerland, but returned to Paris after the amnesty, and died there in 1871. His chief work was his *De l'Humanité* (1839).

Lerwick (ler'wik), a seaport town of Scotland, capital of Shetland, in Bressay Sound, on the southeastern shore of Mainland. There are no manufactures of consequence; but the trade, favored by the fine anchorage in the bay, is considerable. Many of the inhabitants are employed in the fisheries. Pop. 4061.

Le Sage, or LESAGE (lė-säzh), ALAIN RENÉ, a French novelist and dramatic writer, born in 1668 at Sarzeau, in Brittany. He studied at the college of the Jesuits at Vannes, in 1692 went to Paris to study law, and in 1694 he married. To procure a livelihood he abandoned law for literature, his first attempts being in imitation of the Spanish drama. He subsequently translated Avellaneda's continuation of the *Adventures of Don Quixote*, and a comedy of Calderon; but his first success was with his *Crispin Rival de son Maître* (1707). *Le Diable Boiteux*, imitated from a Spanish romance, *El Diablo Cojuelo*, appeared the same year. In 1715 he published the first two volumes of *Gil Blas*, one of the best romances in the French language, the third volume appearing in 1724, the fourth in 1735. In 1732 he published *Les Aventures de Guzman d'Alfaraehe* (based on Aleman's work); and the following year *Les Aventures de Robert, dit le Chevalier de Beauehesne*, containing the real history of a freebooter, from papers furnished by his widow. In 1734 appeared *L'Histoire d'Estevanille Gonzales*. The last of his novels was *Le Bachelier de Salamanque* (1738). He died in 1747. He wrote also many theatrical pieces, etc.

Le Sage, GEORGE LEWIS, a Swiss philosopher, born at Geneva in 1724; died in 1803. He published works on chemistry, etc., but is chiefly known for his gravitation hypothesis, in which he ascribed gravitation to the force exerted by a vast multitude of minute corpuscles flying at great speed in every direction through space. Though now discredited, this hypothesis had a long acceptance by many students.

Lesbos (les'bos), a Greek island situated off the northwest coast of Asia Minor, now called *Mitylene*, from its capital. In shape it is nearly triangular; has an area of 276 square miles, and a population of about 25,000, and now belongs to Turkey. It is mountainous, but is exceedingly fertile, its principal products being figs, grapes, olive-oil and pine timber. The island formerly contained nine cities, the chief being Mitylene. It was a flourishing state in ancient times, till conquered by Athens, and was the birthplace of the poet Sappho.

Lesghians (les'gi-ans), a Tartar people of the Mohammedan religion, inhabiting the eastern Caucasus, and forming the chief portion of the inhabitants of Daghestan. They were among the most stubborn of the Caucasian peoples in their resistance to the Russians.

Lesina (les'ē-nä), or LES'SINA, an island in the Adriatic, on the coast of Dalmatia, consisting of a long and narrow strip, stretching east to west for 40 miles, with a breadth of 2 to 6 miles, and presenting a continuous chain of hills, which, on the coast, form lofty and precipitous cliffs. Wine, olive-oil and fruit are produced. The principal town, bearing same name, is on the southwest coast, and has a good natural harbor. Pop. 18,091.

Lesley (les'lė), J. PETER, geologist, born at Philadelphia in 1819; died in 1905. He was engaged for several years on the geological survey of Pennsylvania, in 1873 was appointed professor of geology at the University of Pennsylvania, and in 1874 was put in charge of the State Geological Survey, which he conducted with much ability. He wrote *A Manual of Coal, Man's Origin and Destiny*, etc. He was connected with the leading scientific institutions.

Leslie (les'le), ALEXANDER, Earl of Leven, a Scottish general, born about the end of the sixteenth century. He went abroad, and rose to be field-marshal in the service of Gustavus Adolphus. Returning home in 1639 he was chosen general-in-chief of the Covenanters' army, and defeated the king's army at Newburn. In 1644 he went to the assistance of the English Parliament, and led a division at Marston Moor. In 1646 Charles I gave himself up to Leslie's army, then encamped at Newark. At the battle of Dunbar he served as a volunteer, and was soon afterwards thrown into the Tower by Cromwell, but soon liberated at the intercession of Christina of Sweden. He died at an advanced age in 1661. The peerage of Leven is now merged in that of Melville.

Leslie, CHARLES ROBERT, painter, born in London in 1794, was when very young taken by his parents to the United States, where he was apprenticed to a bookseller in Philadelphia. Having

shown artistic ability, he was sent to England, and became a pupil at the Royal Academy about 1813. Among his most successful early pictures were *Anne Page and Slender* (1819); *Sir Roger de Coverley going to Church* (1820); and *May-day in the reign of Queen Elizabeth.* In 1824 he produced *Sancho Panza and the Duchess*, the first of his pictures from *Don Quixote*—a work which furnished him with some of his happiest subjects. He painted other scenes from the *Spectator*, from *Tristram Shandy*, and from other popular novels, and a number of historical incidents. He was elected an associate of the Academy in 1821, an academician in 1826. From 1848 to 1851 he was professor of painting at the Academy. He died in 1859. Leslie is distinguished for the delineation of character and expression, and for excellence in composition rather than for his coloring.

Leslie, David, Lord Newark, a Scottish general and Presbyterian leader, born in Fifeshire in the early part of the seventeenth century. He served for some time under Gustavus Adolphus, king of Sweden, but returned to Scotland about the commencement of the civil wars, and in 1644 accompanied the Earl of Leven with the Scottish force sent to assist the parliament. His Scottish horse supported Cromwell's decisive charge at Marston Moor. Leslie was then recalled to check the successes of Montrose in the north, and routed him at Philiphaugh, near Selkirk. With the change in Scottish politics the Scottish army returned home, and Leslie was employed for some time in putting down insurrection, chiefly in the north and west among the Highlanders. When, however, the Scottish Parliament took up arms on behalf of Charles II, Leslie was appointed commander-in-chief, and proved himself no unworthy opponent of Cromwell, but was finally defeated at Dunbar in 1650. He afterwards retreated to Stirling, where he was joined by Charles II, who assumed the command of the army. After the battle of Worcester Leslie was captured in Yorkshire, and imprisoned in the Tower till the restoration. In 1661 he was rewarded for his services to the royal cause with the title of Lord Newark, and a pension of £500. He died in 1682.

Leslie, Eliza, an American prose writer, sister of Charles Robert mentioned above, was born at Philadelphia in 1787; died in 1858. She wrote sketches, the humor and satire of which gave them great popularity. Her novels include *Atlantic Tales*, *Rival Sketches*, etc.

Leslie, John, Bishop of Ross, prelate and diplomatist, born in Scotland in 1526 or 1527, studied at Aberdeen, Toulouse, Poitiers and Paris. He escorted Queen Mary from France in 1561, and was always one of her most active friends. For his intrigues on her behalf he was imprisoned in the Tower, and on his liberation went to France, where in 1593 he was made Bishop of Coutances. He died in a monastery near Brussels in 1596. His works include a work *De Origine, Moribus, et Rebus Gestis Scotorum* (1578); and a *History of Scotland* from 1436 to 1561.

Leslie, Sir John, a Scottish physicist and mathematician, born at Largo, Fife, in 1766. He studied at the University of St. Andrews, and then at Edinburgh. After a short stay in America he returned to London, where he commenced his translation of Buffon's *Natural History of Birds*, published in 1793. He invented the differential thermometer about the year 1800, and four years later published his *Essay on the Nature and Propagation of Heat.* In 1805 he was elected to the chair of mathematics in the University of Edinburgh, a post which in 1819 he exchanged for the professorship of natural philosophy. Through one of his contrivances, his hygrometer, he arrived in 1810 at the discovery of a process of artificial congelation, which enabled him to freeze mercury. In 1809 he published his *Elements of Geometry;* in 1813 an *Account of Experiments and Instruments depending on the Relation of Air to Heat and Moisture;* in 1817 his *Philosophy of Arithmetic;* in 1821 his *Geometrical Analysis and Geometry of Curve Lines;* in 1822 a volume of *Elements of Natural Philosophy;* and in 1828 his *Rudiments of Geometry.* Besides these works he contributed largely to the *Edinburgh Review*, the *Encyclopædia Britannica*, etc. He died in 1832, having been knighted not long before.

Lesseps (lā-sep), Ferdinand, Vicomte de, a French diplomatist and engineer, born in 1805. After holding several consular and diplomatic posts he retired from the government service, and in 1854 went to Egypt, and proposed to the viceroy the cutting of a canal across the Isthmus of Suez. This great work was successfully completed in 1859-69, under his supervision, and brought him high honors. Another grand scheme undertaken by him was the unfortunate Panama canal (which see), in the management of which his reputation suffered sadly. He was accused of breach of trust and sentenced to a fine and five years' imprison-

ment, but was too ill to be taken from his house, where he died in 1894.

Lessing (les'ing), GOTTHOLD EPHRAIM, a German critic, dramatist and scholar, born in 1729 at Kamentz, in Upper Lusatia. He entered the University of Leipzig in 1746 to study theology, but his love of the drama and his intimacy with Schlegel, Mylius, Weisse, and other young men of literary tastes led him to abandon this intention. He undertook, with Mylius, in 1750, a publication entitled *Beiträge zur Historie und Aufnahme des Theaters* ('Contributions to the History and Improvement of the Theater'); published some poems under the title of *Kleinigkeiten* ('Trifles'); translated a work of the Spanish philosopher Huarte; and wrote some articles in *Voss's Gazette*. He entered at this time into friendly relations with Moses Mendelssohn and the bookseller Nicolai, in conjunction with whom he established the critical journal, *Briefe die neueste Literatur betreffend* ('Letters on the Newest Literature'). In 1755 appeared *Miss Sara Sampson*, a tragedy dealing with English life. In 1760 Lessing became secretary to General Tauenzien in Breslau for five years, when he returned to Berlin and published the *Laokoon oder über die Grenzen der Malerei und Poesie* ('Laocoon, or on the Limits of Painting and Poetry'), and his comedy *Minna von Barnhelm*. About 1767 he became director of the National Theater at Hamburg. While here he wrote his *Dramaturgie*. His criticisms made him enemies, and having been compelled to quit Hamburg, the Duke of Brunswick appointed him his librarian at Wolfenbüttel. In 1775 he went to Vienna and accompanied Prince Leopold of Brunswick to Italy. He married in 1776, but his wife died in little more than a year. At this period he was involved in fierce theological disputes, which his philosophical drama *Nathan der Weise* (1779) did nothing to allay. Besides those mentioned, he wrote another drama, *Emilia Galotti* (1772). He died at Brunswick in 1781.

Lestrange (les-trānj'), SIR ROGER, political controversialist, journalist and translator, born at Hunstanton Hall, Norfolk, in 1616. In 1629 he attended Charles I in his expedition into Scotland. In 1644 he formed a plan for surprising Lynn, but was seized and condemned as a spy. He was, however, respited from time to time until he had lain in prison four years, when he made his escape to the continent. In 1653 he returned to England. He was licenser of the press from the restoration until the close of the reign of James II, and himself edited the *Public Intelligencer* in 1663, the *London Gazette* in 1665, and the *Observator* in 1679, the latter existing till 1687. He died in 1704. He was the author of a great number of coarse and virulent political tracts, and translated Josephus, Cicero's *Offices*, Seneca's *Morals*, Quevedo's *Visions*, etc.

Lestris (les'tris), the genus of birds to which belong the Arctic gull and the skua gull, the most formidable of all the gull kind.

Lesueur (lē-sü-*eur*), EUSTACHE, a French painter, born in 1617; studied under Simon Vouet. He married in 1644, and was compelled for a living to execute vignettes and frontispieces for books. His first works are in the style of his master, and quite distinct from his subsequent ones. His great work was the series of paintings which he executed for the Carthusian monastery in Paris in 1645-48, delineating in twenty-two pictures the principal scenes in the life of St. Bruno. In 1650 he painted for the corporation of goldsmiths the *Preaching of the Apostle Paul at Ephesus*. All of these are large paintings, and are now in the Louvre. Among the most distinguished of his later works are some mythological scenes. He died in 1655. His works are distinguished for grace rather than power, and are inferior in respect of color.

Lesueur, JEAN FRANÇOIS, a French musical composer, a descendant of the painter Lesueur; born in 1760. In 1786 he was appointed chapel-master at Nôtre Dame, but his first opera proving successful, he resigned this post, and for some time devoted himself to operatic work. His chief operas were *La Caverne* (1792), *Paul et Virginie* (1794), *Télémaque* (1796), *Les Bardes* (1804), and *La Mort d'Adam* (1809). He was made professor of music in the National Institute, and though afterwards displaced by intrigue, was again restored by Bonaparte. In 1814 he was appointed composer to the king; and in 1817 professor of composition to the Conservatoire. His sacred music consists of thirty-three masses, oratorios and motets. He died in 1837.

Lethargy (leth'ar-ji), an unnatural tendency to sleep, closely connected with languor and debility, and much resembling apoplexy in character. It may arise from a plethoric habit, from deficient circulation in the brain, from nervous exhaustion of that organ, from a poisoned state of the blood, or from a suppression of urine. When it is the consequence of alcoholic intoxication or of

the action of narcotics it should be treated by stimulants, the application of heat, etc.

Lethbridge, a town of Alberta, Canada, about 100 miles w. of Medicine Hat, in a farming and coal-mining region. Pop. 8050.

Lethe (lē'thē; Greek, *lēthē*, forgetfulness), the River of Oblivion, one of the streams of the lower regions celebrated in ancient mythology, whose water had the power of making those who drank of it forget the whole of their former existence. Souls before passing into Elysium drank to forget their earthly sorrows; souls returning to the upper world drank to forget the pleasures of Elysium.

Lethington. See *Maitland, William.*

Leto. See *Latona.*

Letter of Attorney. See *Attorney.*

Letter of Credit. See *Credit.*

Letter of Marque. See *Marque.*

Letters. See *Alphabet, Consonant, Vowel, Writing*, etc.

Letters-patent, the name of an instrument, not sealed, granted by the government, conferring on a person or a public company special or peculiar privilege. Letters-patent are issued to protect new inventions, and from this is derived what is called patent-right. See *Patent.*

Letts (letz), a Slavonic people closely akin to the Lithuanians inhabiting Courland, Livonia, Vitebsk and Kovno. Their language, along with the Lithuanian and Old Prussian (extinct), forms the Lettic or Lithuanian branch of the Indo-European family of tongues. The Letts number about 1,500,000.

Lettuce (let'is; *Lactūca satīra*), a smooth, herbaceous, annual plant, containing a milky juice, and in general use as a salad. The stem grows to the height of about 2 feet, and bears small, pale-yellow flowers; the inferior leaves are sessile, and undulate on the margin. The young plant only is eaten, as the lettuce is narcotic and poisonous when in flower. A number of species are known from various parts of the globe. *Lactucarium*, or lettuce opium, the inspissated juice of the lettuce, is used medicinally as an anodyne.

Lettuce-bird, the American goldfinch (*Spirus tristis*). It is a bird of the gardens and orchards and one of the most widely distributed of the smaller seed-eating American birds. It nests in the village shrubbery and has a short but very sweet song, uttered while in flight.

Leucadia (lö-kā'di-a), or SANTA MAURA, one of the Ionian Islands, on the west coast of Greece, 18 to 20 miles long, and 7½ to 10 miles wide. Its surface is mountainous and rugged. The eastern side is waste and barren, but the western and northern parts are very productive, yielding vines, olives, citrons, etc. The southwestern extremity, now Cape Ducato (also known as the Leucadian Rock, or the Lover's Leap), is a white cliff rising to the height of at least 2000 feet. On its summit was a temple of Apollo, in whose honor a criminal was annually thrown from the rock into the sea as a sin-offering. Sappho, Artemisia, and other despairing lovers are said to have thrown themselves from it. Amaxichi is the chief town. Pop. of the island, 31,769.

Leuchtenberg (loi*h*'ten-ber*h*), in the middle ages an independent landgraviate of Germany, which, by the extinction of the male line, fell to Bavaria in 1646. From it Eugène Beauharnais took the title of Duke of Leuchtenberg.

Leucippus (lū-sip'us), a Greek philosopher, founder of the atomic school, lived 500 years B.C., and is said by some to have been a native of Abdera; by others, of Elis or the Island of Melos. His instructor was Zeno the Eleatic, or, according to others, Parmenides, and he himself was the teacher of Democritus.

Leuciscus (lū-sis'kus), the genus of fishes which contains the roach, dace and bleak.

Leucocythæmia (lū-co-si-thē'mi-a), LEUCOCYTHEMIA, in medicine, a disease in which the blood presents a great increase of the white corpuscles, the spleen and lymphatic glands being at the same time enlarged.

Leucojum (lū-ko'jum), LEUCOIUM, a genus of bulbous plants, nat. order Amaryllidaceæ. They are very like snowdrops, but the six perianth-segments are nearly equal. No varieties have been developed from this favorite plant by cultivation.

Leucoma (lū-ko'ma), a white opacity of the cornea of the eye, the result of acute inflammation. Called also *Albugo.*

Leucopathy. See *Albinos.*

Leucorrhœa (lū-ko-rē'a), in medicine, a pathological discharge of a catarrhal, white, yellowish, or greenish mucus from the female genital

organs, due to acute or chronic inflammation, which may be infectious in character. It is treated by antiseptic and astringent douches, paying particular attention to any local condition found present and to the general health of the afflicted person.

Leuctra (lūk'trå), a village in Bœotia, on the road from Thespiæ to Platæa, famous for the victory of the Theban Epaminondas over the Spartan king Cleombrotus, which put an end to Spartan domination in Greece (371 B.C.).

Leuk (loik), a town of Switzerland, canton of Valāis, on the right bank of the Rhone, 15 miles E. N. E. of Sion. About 5 miles to the north the celebrated thermal saline baths of Leuk (Leukerbad).

Leutze (loit'seh), EMANUEL, artist, was born in 1816 in Würtemberg, Germany; died in Washington, D. C., in 1868. He was a pupil of Leslie. Among his best known paintings are: *Columbus Before the Council of Salamanca, Columbus Before the Queen, The Landing of the Norsemen in America, Cromwell a d his Daughter, Washington Crossing the Delaware, News From Lexington* and *Westward the Star of Empire Takes its Way;* the latter in the Washington capitol.

Levaillant (lė-vā-yän), FRANÇOIS, a French traveler, born in 1753. He made two expeditions into the interior of Africa, his accounts of which were published in 1790 and 1796. He died in 1824.

Levant (lē-vant'), a term applied in the widest sense to all the regions eastward from Italy as far as the Euphrates and the Nile, and in a more contracted sense to the Asiatic coasts of the Mediterranean and the adjacent countries from Constantinople to Alexandria in Egypt.

Leva'ri-facias (le-vär'ī fā'shi-as), a writ of execution issued at common law.

Levee (lev'ē), a morning reception held by a prince or great personage. The term is chiefly applied in Britain to the stated public occasions on which the sovereign receives visits from such persons as are entitled by rank or fortune to the honor. In the United States the term *levee* is applied to an official reception, at any hour of the day or evening.

Levee (Fr. *levée*), in America, an embankment on the margin of a river, to confine it within its natural channel, such as may be seen extending for long distances along the banks of the lower Mississippi.

Level (lev-el), an instrument by which to find or draw a straight line parallel to the plane of the horizon, and by this means to determine the true level or the difference of ascent or descent between several places, for various purposes in architecture, agriculture, engineering, hydraulics, surveying, etc. There is a great variety of instruments for this purpose, differently constructed and of different materials, according to the particular purposes to which they are applied, as the carpenter's level, mason's level, gunner's level, balance level, water level, mercurial level, spirit level, surveying level, etc. All such instruments, however, may be reduced to three classes:— (1) Those in which the vertical line is determined by a suspended plumb line or balance weight, and the horizontal indicated by a line perpendicular to it. Such are the carpenter's and mason's levels. (2) Those which determine a horizontal line by the surface of a fluid at rest, as water and mercurial levels. (3) Those which point out the direction of a horizontal line by a bubble of air floating in a fluid contained in a glass tube. Such are spirit-levels, which are by far the most convenient and accurate. All levels depend on the same principle, namely, the action of terrestrial gravity.

Levelers (lev'el-ėrz), a name more particularly given to a party which arose in the army of the Long Parliament about the year 1647, and was put down by Fairfax. They aimed at the establishment of an equality in titles and estates throughout the kingdom.

Leveling (lev'el-ing), the art or operation of ascertaining the different elevations of objects on the surface of the earth, or of finding how much any assigned point included in a survey is higher or lower than another assigned point. It is a branch of surveying of great importance in making roads, determining the proper lines for railways, conducting water, draining low grounds, rendering rivers navigable, forming canals, and the like. In ordinary cases of leveling (for example, for canals, railways, etc.) the instruments commonly employed are a spirit-level with a telescope attached to it, and a stand for mounting them on, and a pair of leveling staves. A *leveling staff* is an instrument used in connection with a spirit-level and telescope. It is variously constructed, but consists essentially of a graduated pole with a *vane* sliding upon it so as to mark the height at any particular distance above the ground. In leveling two of them are used together, and being set up

at any required distance the surveyor, by means of a telescope placed between them perfectly horizontally, is enabled to compare the relative heights of the two places.

Leven (lē'ven), Loch, a lake of Scotland, about 10 miles in circumference, in the county of Kindoss. It contains four islands, on one of which was formerly a priory, and on another stand the remains of the castle of Loch Leven, once a royal residence, granted by Robert III to a Douglas. Mary Queen of Scots was confined in this castle after her capture by the confederate lords in 1567, but succeeded in escaping by the aid of George Douglas, her keeper's brother, on May 2, 1568.

Lever (lē'ver), a bar of metal, wood, or other substance turning on a support called the *fulcrum* or *prop*, and used to overcome a certain resistance (called the *weight*) encountered at one part of the bar by means of a force (called the *power*) applied at another part. It is one of the mechanical powers, and is of three kinds, viz.: (1) When the fulcrum is between the weight and the power, as in the handspike, crowbar, etc. In this case the parts of the lever on each side of the fulcrum are called the arms, and these arms may either be equal, as in the balance, or unequal as in the steelyard. (2) When the weight is between the power and the fulcrum, as in rowing a boat, where the fulcrum is the water. (3) When the power is between the weight and the fulcrum, as in raising a ladder from the ground by applying the hands to one of the lower rounds, the fulcrum in this case being the foot of the ladder. The law which holds in the lever is: the power multiplied by its arm is equal to the weight multiplied by its arm. It is evident that when the power has a very large arm, and the weight a very small one, a very small power will overcome a great resistance. In the lever, as in all machines when a small force overcomes a great one, the small force acts through a much greater distance than that through which the great force is overcome, or as is sometimes said, 'What is gained in power is lost in time.'

Lever, Charles James, an Irish novelist, born at Dublin in 1806. He was graduated in arts at Trinity College, Dublin, in 1827, and in medicine in 1831, also taking a doctor's degree a little latter at Göttingen. He then returned to Ireland to practise. In March, 1834, he contributed his first paper to the newly-started *Dublin University Magazine*, of which he became editor in 1842. The first chapter of *Harry Lorrequer* appeared in that magazine in 1837. Meanwhile he was attached as physician to the British legation at Brussels, where he practised for three years. During his three years' editorship of the *Dublin University Magazine* he resided in the neighborhood of the Irish capital, but after his resignation he took up residence on the continent, mainly occupying himself with fiction. His *Charles O'Malley*, *Tom Burke*, *Jack Hinton*, etc., constituted a literature entirely *sui generis*. His later novels were more thoughtful and artistic. He obtained a diplomatic post at Florence about 1845, was appointed vice-consul at Spezzia in 1858, and in 1867 at Trieste, where he died in 1872.

Leverrier (le-vā-ri-ā), Urbain Jean Joseph, a French astronomer, born at Saint-Lô (Manche) in 1811; died at Paris in 1877. He devoted himself at first to chemical research, but some memoirs on the stability of the solar system drew on him the attention of Arago, who induced him to persevere with astronomical studies. His observations on the transit of Mercury in 1845 procured him admission into the Academy of Sciences. His great work was his investigation of the irregularities in the movements of the planet Uranus, carried on simultaneously but independently with those in the same line by John Couch Adams, which led to the discovery of the planet Neptune. He entered political life in 1849, and was made a senator by Napoleon III. He succeeded Arago as director of the observatory, but his arrogance and violence of temper made his tenure of the office a failure. His tables of suns and planets are in general use among astronomers.

Levi (lē'vī), the third son of Jacob and Leah. The chief incident recorded of him, as apart from his brethren, is the part which he played in the massacre of the Shechemites. Three sons went down with him to Egypt—Gershon, Kohath and Merari (Gen., xlvi, 2). Moses and Aaron were of this tribe.

Leviathan (le-vī'a-thun), a form of the Hebrew word *livyathan*, meaning a long-jointed monster, applied in Job, xli, and elsewhere in Scripture to an aquatic animal, variously held to be the crocodile, the whale, or some species of serpent.

Levirate (l e v' e r-āt), Lev'iration (Lat. *levir*, a husband's brother), the custom among the Jews of a man's marrying the widow of a brother who died without issue. The same custom or law prevails in some parts of India.

Levis (lev'is), a town of Canada, on the south bank of the St. Lawrence opposite Quebec with which there is ferry communication. It carries on a large trade by river and rail. Pop. 7452.

Levites (lē'vīts), the name generally employed to designate not the whole Jewish tribe that traced its descent from Levi, but a division within the tribe itself, in contradistinction to the priests, who are otherwise called the 'sons of Aaron.' They were the ministers of worship, specially singled out for the service of the sanctuary. Together with the priests they formed the sacerdotal tribe. A permanent organization was made for their maintenance. In place of territorial possessions they were to receive tithes of the produce of the land, and in their turn to offer a tithe to the priests. After the settlement in Canaan, to the tribe of Levi were assigned forty-eight cities, six of which were cities of refuge, thirteen of the total number being set apart for the priests. To the Levites was to belong the office of preserving, transcribing and interpreting the law, and they were to read it every seventh year at the feast of tabernacles. Their position was much changed by the revolt of the ten tribes, and they are seldom mentioned in the New Testament, where they appear as the types of formal, heartless worship.

Leviticus (le-vit'i-kus), the name of the third book of the Pentateuch, so called from the first word of its contents. By the later Jews it was called the 'Law of the Priests,' and sometimes the 'Law of Offerings.' It consists of seven principal sections, but it may be generally described as containing the laws and ordinances relating to Levites, priests and sacrifices. The integrity of the book is very generally admitted, the Elohist, or author of the original document (see *Elohim*), being credited with having written nearly the whole of it, and the rest being considered originally Elohistic.

Levkosi'a. See *Nicosia.*

Levoglucose (lev-o-glū'kōs), LÆVOGLUCOSE, a sugar isomeric with dextroglucose, but distinguished from it by turning the plane of polarization to the left, and always occurring along with it in honey, in many fruits, and in other saccharíferous vegetable organs.

Levy (lev'i), the compulsory raising of a body of troops for purposes of general defense or offense when the existing troops are insufficient to meet the exigencies of the situation. When a country is in danger of instant invasion a *levée en masse* is sometimes made, every man capable of bearing arms being called out. If the occasion be less urgent the levy may be restricted to men of a fixed class, as between 18 and 40 years of age.

Lewes (lö'es), a municipal borough of England, in Sussex, on the Ouse, 7 miles northeast by east of Brighton. It is built on an acclivity, and is a place of great antiquity, containing the ruins of many ecclesiastical buildings. The chief manufacture is agricultural implements. In its vicinity, in 1264, the barons, under Simon de Montfort, defeated the royal army under Henry III. Pop. (1911) 10,972.

Lewes (lö'es), GEORGE HENRY, philosophical writer and contributor to most departments of literature, born in London in 1817. He was in turn a clerk, a medical student, and a student of philosophy in Germany, from which he returned in 1840 to devote himself to general literature. His first important work was his *Biographical History of Philosophy from Thales to Comte*, originally published in 1845, and subsequently much extended and altered—a work written more or less from a Positivist point of view, and sufficiently proving his ability as a thinker and writer. From 1849 to 1854 he was literary editor of the *Leader*, during that time publishing his *Life of Robespierre* (1850) and a compendium of Comte's *Philosophy of the Sciences* (1853). His *Life of Goethe*, which won him a European reputation, was published in 1855. From 1854 he was largely engaged in physiological investigations with special reference to philosophical problems. To this period belong his *Seaside Studies* (1858), *Physiology of Common Life* (1860), and *Studies in Animal Life* (1861), besides papers contributed to the British Association on the spinal cord and on the nervous system. In 1864 he published a study on Aristotle, and in 1865 founded the *Fortnightly Review*, but was compelled by ill health to retire a year later. The chief work of his life, aiming at the systematic development of his philosophical views, is entitled *Problems of Life and Mind* (1873-77). He died in 1878. Besides the works already mentioned he wrote the Spanish drama, *Lope de Vega and Calderon* (1846); two novels, *Ranthorpe* (1847) and *Rose, Blanche and Violet* (1848); and prepared various plays for the stage under the pseudonym of *Slingsby Lawrence.* See *Eliot, George.*

Lewis and Clark Expedition. When he had completed the Louisiana

Purchase in 1803, adding a vast western region to the territory of the United States, President Jefferson resolved to carry out a project he had proposed while yet in Washington's cabinet, namely, to have the far northwest explored. For leader of this expedition he chose Merriwether Lewis, one of his secretaries, and the latter selected Captain William Clark, brother of the celebrated Revolutionary soldier, George Rogers Clark, as his associate. Taking with them about forty men, they began their journey from the mouth of the Missouri in the spring of 1804. They followed that river until October, and wintered near the site of Bismarck, North Dakota. In May, 1905, they had a first view of the Rockies. After a journey full of hardship they reached the Columbia River, discovered by Captain Grey fourteen years before and named after his vessel, and floated down its stream. On the morning of November 7, 1806, they caught their first glimpse of the Pacific Ocean. They spent the winter on the coast, and then returned, reaching St. Louis in September, 1807. They were the first to discover various Indian tribes and the great expanse of the western territory. Their exploit was commemorated by a grand exposition at Portland, Oregon, in 1905.

Lewis (lö-is), Sir George Cornewall, an English statesman and historian, born in 1806; died in 1863. After serving in government positions, and sitting in parliament 1847-52, he became in 1852 editor of the *Edinburgh Review*. In 1855 he succeeded his father in the representation of Radnorshire, and was immediately appointed chancellor of the exchequer by Lord Palmerston. In 1859 he became secretary of state for the home department, and secretary of state for war in 1861. His chief works were: *Remarks on the Use and Abuse of Some Political Terms* (1832); *Essay on the Origin and Formation of the Romance Languages* (1835); *Essay on the Influence of Authority in Matters of Opinion* (1850); *Inquiry into the Credibility of Early Roman History* (1855); *Astronomy of the Ancients* (1861), and *A Treatise on the Methods of Observation and Reasoning in Politics*.

Lewis, Matthew Gregory, an English romance writer and dramatic author, born in 1775. He was educated at Westminster, and then traveled for some time in Germany, the romantic literature of which gave to him that passion for the marvelous and terrific which chiefly marks his writings. His earliest and most celebrated work was *Ambrosio, or The Monk* (1794), a romance, the first edition of which was suppressed for its licentiousness. Other works were: *Feudal Tyrants*, a romance; *Romantic Tales; Tales of Wonder*, in verse; *Tales of Terror; The Castle Speeter*, a romantic drama, 1798; *Adelmorn, the Outlaw*, 1800; *Alphonso, King of Castile*, 1801; a volume of miscellaneous poetry; the *Bravo of Venice* (a romance translated from the German, 1804), and *Timour, the Tartar*, a melodrama (1812). Mr. Lewis had for some years a seat in Parliament. He died at sea in 1818, while on the voyage home from a visit to his West Indian possessions.

Lewis, Merriwether, explorer, born in Virginia in 1770; died by suicide, during a fit of temporary insanity, in 1809. For his famous exploit see *Lewis and Clark Expedition*.

Lewis River, or Snake River, a river of North America, which rises in the Rocky Mountains, and runs northwest into the Columbia, 413 miles from its mouth; length, about 900 miles. Its course lies partly in Idaho, partly between Idaho and Oregon, and partly in Washington.

Lewiston, a city, capital of Nez Perce County, Idaho, on Snake River, at the head of navigation. It has flour and shingle mills and is in an active mining district. Pop. 6043.

Lewiston, a city of Maine, on the Androscoggin River, which here has a fall of 50 feet, the water power being utilized by several manufactories (chiefly of cotton and woolen goods) and extensive sawmills. Other products are mill-machinery, leather belting, carriages, iron castings, etc. Pop. 26,247.

Lewistown, a borough, capital of Mifflin County, Pennsylvania, on the Juniata River, 61 miles N. W. of Harrisburg. It has steel works, blast furnaces, and other industries. Pop. 8166.

Lexicon. See *Dictionary*.

Lexington (leks'ing-tun), a city of Kentucky, 23 miles E. S. E. of Frankfort. It is the oldest town in the State (having been founded in 1775), and was once the capital. It has extensive manufactures of beer and spirits, flour, soap, etc.; is the center of the 'Blue Grass country,' and has a large trade in grain and live stock. There is here the Kentucky State University. Pop. 35,099.

Lexington, a town of Massachusetts, 11 miles N. W. of Boston, where the first American blood was shed in armed resistance to the mother coun-

try. On April 19, 1775, the advance of a detachment of British troops, sent from Boston to seize some provincial stores at Concord, was opposed by the Lexington militia (70 men), who were dispersed with a loss of eight killed and three wounded. A monument has been erected to the memory of those who fell in that action. Pop. 4918.

Lexington, a city, capital of Lafayette County, Missouri, on the Missouri River, 42 miles E. of Kansas City. It is in a coal-mining region, and has large brickyards, canning factories, etc. Pop. 5242.

Ley. See *Lye.*

Leyden (lī'den; Lat. *Lugdunum Batavorum*), a town of Holland, 22 miles southwest of Amsterdam, on both sides of the Old Rhine. Leyden is encompassed by windmills, and surrounded by country seats, pleasure grounds, gardens and fertile meadows. The streets are straight and broad, the Broad Street (*Breede-straat*) being esteemed one of the finest in Europe. In it is situated the town hall (*Stadhuis*), a picturesque old building, with some important paintings. None of the churches are very remarkable. The most important educational institution is the university, formerly one of the most famed in Europe. It is attended on the average by about 700 students, nearly one-half studying law. Leyden has cloth and other manufactures. A memorable event in its history was its siege by the Spaniards in 1573-74, and its relief by the Prince of Orange, who opened a dike and flooded the Spanish camp. The pop. about 100,000 in the seventeenth century, is now 54,857.

Leyden, JAN, or JOHN OF. See article *Anabaptists.*

Leyden, JOHN, a Scottish poet and orientalist, born at Denholm, Roxburghshire, in 1775; died at Batavia in 1811. Being intended for the Scottish church, he was sent to the University of Edinburgh in 1790. Here his studies included not only theology and the learned languages, but also French, Spanish, Italian, German, Icelandic, Arabic and Persian. He published translations and original poems in the *Edinburgh Magazine;* contributed to Lewis' *Tales of Wonder;* assisted Sir Walter Scott in procuring materials for his *Minstrelsy of the Scottish Border,* and wrote a *History of African Discoveries.* In 1798 he was ordained a Presbyterian minister, but the ministry not being to his taste, he accepted service as assistant-surgeon under the East India Company, a post demanding a surgical degree, which he obtained after six months' study. In India he continued his favorite philological studies, became professor of Hindustani at Bengal College, and shortly after a judge at Calcutta; but fell a victim to climate and overstudy, and died of fever during an expedition to Java with Lord Minto.

Leyden, LUKE OF. See *Luke of Leyden.*

Leyden Jar, an early form of electric accumulator, introduced to the scientific world by Muschenbroek of Leyden in 1746; hence its name. It consists of a glass vial or jar coated inside and outside, usually with tin-foil, to within a third of the top. A metallic rod, having a knob at the top, is fixed into the mouth of the jar, and is made to communicate with the inside coating, and when the jar is to be charged the knob of this rod is applied to the prime conductor of an electric machine. As the electric fluid passes to the inside of the jar an equal quantity passes from the outside, so that the two coatings are brought into opposite states, the inside being positive and the outside negative. The jar is discharged by establishing a communication between the outside coating and the knob. When a number of jars are placed in a box lined with tin-foil connected with the earth, their knobs being joined together, they form a *battery;* a quantity of electricity equal to the sum of the charges which would be received by each jar can be collected in such a battery, capable of melting fine metallic wires, puncturing plates of glass or cardboard, killing animals, rupturing bad conductors, etc.

Leyden-jar.

Lhassa. See *Lassa.*

L'Hôpital (lō-pi-tål), MICHEL DE, an eminent French chancellor and author; born about 1504; died in 1573. Admitted to the bar in Paris, he rapidly rose in his profession until he became superintendent of the royal finances in 1554, a position in which his services were of the highest value. In 1560 he was appointed to the chancellorship of France. The country suffered severely at this time from the struggles between Catholics and Protestants. L'Hôpital rendered great service in mediating between the rival factions, and was the principal author of the Edict of Toler-

ance of 1562. When violence was resolved on for the extermination of the reformed religion, he found it necessary to resign. The atrocities of St. Bartholomew's day in 1572 were a great shock to him, and he only survived that event by a few months.

Li, LE, or CASH, the only copper coin of China, with a square hole in the middle, and an inscription on one side. Ten lis make one candareen, 100 a mace, 1000 a liang or tael, the only Chinese silver coin, of varying value, averaging a little over a dollar. Li is also a Chinese measure of length equal to about ⅓ of an English mile.

Liability, LIMITED. See *Joint-stock Companies.*

Lia-fail, or STONE OF DESTINY, a broad gray stone on which the kings of Scotland were crowned in the Abbey Church of Scone. In 1296 Edward I carried it to England, and it still remains under the coronation chair in Westminster Abbey. Tradition has it that it is the very stone upon which the patriarch Jacob laid his head in the plains of Luz.

Lianas (lē-an'az), a term applied to those climbing and twining plants found in profusion in tropical climates, where in many instances they overtop the heads of the tallest trees, and intertwine the entire forest by their cable-like shoots, forming an impenetrable network, which it is necessary to break through with the hatchet. Vanilla, sarsaparilla, and other medicinal plants are true lianas.

Liaotung (lē-'ou-töng), a region of Manchuria, stretching into the Yellow Sea between the gulfs Liaotung and Corea. Port Arthur is situated at the extremity of the peninsula thus formed. It forms the greater part of the province of Shing-King. It was an important seat of the Russo-Japanese war.

Lias (lī'as), in geology, the name given to that series of strata, consisting principally of thin layers of limestone embedded in thick masses of blue, argillaceous clay, lying at the base of the Oolitic or Jurassic series, and above the Triassic or New Red Sandstone. The formation is highly fossiliferous, ammonites being found in such quantities and varieties as to be called into use in the classification of the different beds. Gryphites and belemnites are also very common molluscs. Fish remains are frequent; but of all its fossil remains by far the most important are those of the great reptiles, of which the ichthyosaurus, plesiosaurus and enaliosaurus are representatives. Numerous remains of plants occur in the lias. See *Geology.*

Libanius (li-bā'ni-us), a distinguished Greek sophist and rhetorician, born at Antioch about A.D. 314; died at the same place about 395. He studied at Athens, and taught with great success at Constantinople and at Nicomedia. He used his eloquence in obstructing the spread of Christian ideas, and in the defense of paganism. St. Basil and St. Chrysostom were warmly attached to him. His letters have, besides great literary merit, much historical value, as they were addressed to the most eminent men of his time.

Lib'anus, MOUNT. See *Lebanon.*

Libau (lē'bou), an important seaport of Russia, government of Courland, at the mouth of the lake of the same name, on the Baltic. It has an artificial harbor, which has been recently much improved, and has gained importance as a seaport. Its trade in corn, flax, hemp, etc., is considerable. Pop. 64,505.

Libel (lī'bel), in law, the act of publishing malicious statements with intent to expose persons or institutions to public hatred, contempt, or ridicule, and thereby provoking them to anger, causing a breach of the peace, injury to reputation, business, etc. The difference between libel and slander is, that in the former case the defamation must have been effected in writing, printing, or some other visible manner, while in the latter the offense is committed verbally. Publication is held to have taken place if the libel is seen but by one person other than the person libeled. The law distinguishes defamatory, seditious and obscene libel. A defamatory libel may result in civil and criminal proceedings against both the publisher and the writer, but to come under this category it is essential that the libel be false, malicious (the law presuming malice in every injury done intentionally and without justification), have a tendency to provoke hatred or contempt, and that it be non-privileged. In criminal law it is a misdemeanor to publish or threaten to publish a libel; or as a means of extortion, to offer to abstain from or to prevent others from publishing a libel. In the United States the punishment for this offense is imprisonment fixed by statute in the different States. A seditious libel is one directed against the head of the state, the legislature, the courts of justice, etc., and its publication constitutes also a misdemeanor. The term obscene libel comprises any obscene publication, and the publisher thereof is liable to imprisonment with hard labor. If

the charges contained in the libel are true a civil action cannot be maintained, but the truth of the libelous matter is no defense at common law; at the same time it generally secures the defendant the merciful consideration of the court. In a civil action the plaintiff recovers damages, the amount of which is settled by the jury; upon an indictment, the jury has merely to acquit the defendant or to find him guilty, after which the court passes judgment, and awards punishment, generally fine or imprisonment, or both. Recent legislation and decisions in this branch of law in Great Britain and the United States (the American laws differ but little from those of Great Britain) have a tendency to limit liability for action to purely false, scandalous and malicious libels. Truth, if published with good motives and for justifiable ends, is now admitted as a good defense, and even motive alone, though the statements may prove untrue.

Libel, in nearly all ecclesiastical and admiralty courts, is the name given to the formal written statement of the complainant's ground of complaint, in the civil litigation, against the defendant. In Scotch law, an indictment on which either a civil action or criminal prosecution takes place.

Libel'lula. See *Dragon-fly.*

Liber. See *Bark.*

Liberal Arts. See *Arts.*

Liberal Party (lib'ėr-al), in modern politics, the party which claims to be distinctively that of reform and progress. The main objects of liberal agitation and legislation are to vest increased power in the people, and to extend privileges to the masses which were formerly monopolized by the favored classes. Most European countries have a powerful liberal party, and liberalism is rapidly spreading in Europe, particularly in Great Britain, Germany, Italy, Spain, Holland, Norway and Sweden. In Great Britain Liberal and Conservative ministries follow each other at irregular intervals, and on the whole the system works well. In the United States the party of progress, that standing between conservatism and radicalism, has adopted various titles in different states.

Libe'ria, a negro republic on the west coast of Africa, founded in 1820 by liberated American slaves under the auspices of the American Colonization Society, and recognized as an independent state in 1847. It lies between the rivers San Pedro and Manna, has 500 miles of seaboard, and extends some 100 miles inland; area 14,000 to 15,000 square miles. The soil is fertile, well watered, and highly adapted to the cultivation of all tropical products. The chief crop is coffee, increasing quantities of which are grown from year to year and exported, other exports being palm-oil, groundnuts, caoutchouc and ivory. The climate is very unhealthy for Europeans. British weights, measures and moneys are mostly in use. The English language predominates among the governing class, Protestant churches and schools are amply provided, and civilization is making rapid strides among the natives. The population consists of some 60,000 immigrants from the United States and their descendants, and about 2,000,000 natives; Monrovia is the capital. The government of the republic is on the model of the United States. Recently, its territory has been trenched upon by adjoining British and French settlements, and protection has been asked from the United States. In response this country undertook the full charge of the finances, military organization, agriultural methods and boundary questions of Liberia, and made arrangements for a loan to pay off the existing debt and obligations of the country.

Libertines (lib'ėr-tinz), or LIBERTI'NI, a sect of fanatics in the sixteenth century in Holland and Brabant, who maintained that nothing is sinful but to those who think it sinful, and that perfect innocence is to live without doubt. They advocated community of goods, etc. The name was also applied in England to the early Anabaptists about the middle of the sixteenth century.

Liberty Bell, THE, which rang out the tidings of the adoption of the Declaration of Independence in 1776, was originally cast in England, but on its arrival in Philadelphia a crack developing it was recast. It was in use from 1753 until 1835, when the fracture now seen occurred while it was being tolled upon the occasion of the funeral of Chief Justice Marshall. The inscription on it, from Leviticus xxv, 'Proclaim liberty through all the land to all the inhabitants thereof,' was also on the bell cast in England. It is especially significant in view of the history of the bell.

Liberty, CAP OF, a cap used as a symbol of Liberty. In ancient times Roman manumitted slaves put on what was termed the Phrygian cap, in token of their freedom. In modern times the name cap of liberty was given to a red cap worn by French and other revolutionaries.

THE CONGRESSIONAL LIBRARY, AT WASHINGTON

Libra (lī'brȧ), the seventh sign of the zodiac.

Library (lī'brȧ-ri), the name given to a collection of books, and to the building in which it is located. Libraries existed in ancient Egypt and Assyria, and Pisistratus is credited with the honor of introducing a public library at Athens about B.C. 337. Cicero and various wealthy Romans made collections of books, and several Roman emperors established libraries, partly with books obtained as spoils of war. By far the most celebrated library of antiquity was the Alexandrian. (See *Alexandrian Library.*) In the West libraries of some note were founded in the second half of the eighth century by the encouragement of Charlemagne. In France one of the most celebrated was that in the abbey St. Germain des Prés, near Paris. In Germany the libraries of Fulda, Corvey, and in the eleventh century that of Hirschau, were valuable. In Spain, in the twelfth century, the Moors had seventy public libraries, of which that of Cordova contained 250,000 volumes. In Britain and Italy libraries were also founded with great zeal; in the former country by Richard Aungérville; in the latter by Petrarch, Boccaccio, and others. After the invention of the art of printing this was done more easily and at less expense. The principal European libraries of modern times are the national library at Paris, with about 2,500,000 of books and 10,000 MSS., and the British Museum library, London, with 2,000,000 books and 100,000 MSS. The central court library at Munich, the imperial library at St. Petersburg, and the royal library at Berlin have each over a million volumes and thousands of MSS. Other large and valuable libraries are the imperial library at Vienna; the royal libraries at Stuttgart, Dresden and Copenhagen; the university libraries of Genoa, Prague, Göttingen, Upsala, Oxford, Cambridge and Dublin; also the libraries of Moscow, Venice, Florence, Milan, Bologna, Naples and the Advocates', Edinburgh. The Vatican library, Rome and the Bodleian, Oxford, are particularly valuable in rare books and MSS. In the United States the era of libraries began with that of Harvard College, founded in 1638, and now possessing over 850,000 books. A public library was founded in New York in 1700, and the Yale College library began the same year. Franklin in 1731 founded the first library in Philadelphia, which he spoke of as 'the mother of all North American subscription libraries.' A national library was founded at Washington in 1800. It is now the Library of Congress, and occupies the most magnificent and well-equipped library building in the world, on the shelves of which are about 1,750,000 books, with large numbers of manuscripts, maps, prints, etc. At present all our principal cities have large and rapidly growing libraries, those of Boston, New York, Philadelphia and Chicago being especially notable. The spread of education and the consequent growing taste for knowledge have called into existence innumerable smaller libraries, ready of access, and providing such literature as the special class of readers demand. This public library system has naturally been most developed in highly-educated countries, such as the United States, Germany, France and Great Britain. Public libraries, the books of which are loaned free to readers, have had an especially active development in the United States, the recent movement in this direction having been greatly stimulated by the liberal donations of Andrew Carnegie, who has provided funds for the founding of libraries in many of our smaller cities, and for large numbers of branch libraries in the principal cities. Some of these public libraries have attained a great growth, that of Boston having considerably over 800,000 books, and that of New York reaching 800,000. In 1900 there were in the United States 5385 libraries, with 44,591,851 books. Since that date there has been a rapid increase, especially in the number of books. The American Library Association, founded in 1876, has done much to stimulate this growth and the opportunity for cheap and versatile reading, in all the chief centers of civilization, is now in a flourishing state,

Libretto (li-bret'tō; It. *little book*), the book containing the story of an opera. In very many cases this is destitute of any literary quality, taste, or consistency. The Italian librettos are especially poor, and the German and English little better. Many poets and author playwrights have attempted libretto writing and subjects for operas have been taken from the works of Shakespere, Goldsmith, Goethe, Scott, Hugo, etc. Wagner stands alone in having written the librettos of his own music-dramas.

License (lī'sens), in law, the grant of permission to do some lawful act; also the document conferring such authority. All civilized countries require that persons should not carry on certain trades or professions, or do certain acts, without previous grant of license, and such licenses may be imposed for the sake of regulating traffic or raising revenue. Most numerous are licenses issued to empower persons to sell certain articles. In

Great Britain the articles not to be dealt in without a license include: beer, cider, wines and spirits, tobacco and snuff, patent medicines, gold and silver, game, sweets; besides these there are licenses for auctioneers, appraisers, armorial bearings, carriages, dogs, guns, hawkers and peddlers, male servants, pawnbrokers, etc. The license laws of America vary in the different States. A number of the States have adopted Local Option, in the question of liquor sale; others have prohibited the sale of intoxicants as a beverage, and some have imposed an almost restrictive license duty. The States that have adopted prohibition embrace Maine, Alabama, Georgia, Kansas, Mississippi, North Carolina, North Dakota, Oklahoma and Tennessee. Alabama in 1911 voted to repeal prohibition and Maine, the original prohibition State, narrowly defeated repeal. Local option has brought about the prohibition of liquor sale in great parts of many other States. In Canada an act for the licensing of places for the sale of liquor came into operation in 1884. By it boards of licensing commissioners are established all over the country, and the number of hotel and saloon licenses to be granted in any locality is determined by the population.

Licentiate (lī-sen'shi-āt), literally a person licensed. It may express that a person possesses certain medical or other qualifications. Thus there are licentiates of the Royal College of Surgeons, licentiates in dental surgery, etc. Among Presbyterians it is applied to a person authorized by a presbytery to preach, and who thus becomes eligible to a pastoral charge.

Lichen (lī'ken, or lich-en), in medicine, a skin disease affecting adults. It consists of a number of pimples, red or white in color, either clustered or disseminated over the surface of the skin, with or without fever, or derangement of the digestive organs, usually terminating in slight desquamation, and very liable to recur, though not contagious. There are several varieties of this eruption, but in the milder forms all that is necessary is to avoid excess, especially in rich food and the use of stimulants, and to take a light diet, with diluent drinks, and a gentle laxative occasionally. Strong external applications should not be employed, but lotions of lime-water or weak solutions of the bicarbonate of ammonia, afford relief. The prickly heat so well known to dwellers in tropical climates, is a species of lichen.

Lichens, a very extensive order of cryptogamic or flowerless plants. According to a modern theory, lichens are not simple plants, but are fungi parasitic on algæ, the two being mutually dependent. They have neither stem nor leaves, but consist mainly of a *thallus* deriving its nourishment from the air. They are reproduced by spores contained in fruits called *apothecia*, which are regarded as the fungi of the particular lichen. They are common everywhere, usually in the form of flat crusts, sometimes of foliaceous expansions, adhering to rocks, the trunks of trees, barren soil, etc. They are found flourishing to the very verge of perpetual snow, and one species, the reindeer-moss (*Cladonia rangiferina*), grows in the greatest profusion in the Arctic regions, where it forms the reindeer's chief sustenance. The Iceland moss (*Cetraria Islandica*) is also abundant in the Arctic regions, and often affords aliment to the inhabitants. (See *Iceland Moss.*) Several other lichens afford dyes of various colors, these being chiefly obtained from rocks in the Azores and Canaries. Litmus is also obtained from a lichen. See *Archil, Litmus.*

Lichfield (lich'fēld), an episcopal city of Staffordshire, England, 17 miles southeast of Stafford. The principal edifice is the cathedral, a large and handsome structure, partly in the early English and partly in a more recent style, with a richly decorated west front, and three spires—two on the west, each 180, and one in the center 280 feet high. The most distinguished native is Dr. Johnson, to whom a monument has been erected facing the house where he was born. The see of Lichfield was founded in 656. For parliamentary representation the city is now included in the Lichfield division of Staffordshire. Pop. 8617.

Lich-gate (lich'gāt; literally 'corpse-gate'), in architecture, a sort of open shed or covered gateway at the entrance to a churchyard, beneath which the bearers of the coffin awaited the arrival of the priest, who there commenced to read the burial service, and thence walked before the mourners to the grave.

Lick, James, philanthropist, was born in Fredericksburg, Pennsylvania, in 1796. In 1847 he settled in California, accumulating a large fortune. He died in 1876, leaving by will about $5,000,000 to various public uses, chiefly educational. These include a school of mechanical arts and the Lick Observatory, which contains one of the largest telescopes in the world.

Lictors (lik'turz), in Rome, were the public servants who attended upon the chief magistrates, consuls, præ-

tors, etc., to clear the way for them, and cause due respect to be paid to them. They carried axes tied up in bundles of rods, called *fasces*, as ensigns of office, and were selected from the lower class of free men. The number of lictors preceding the state dignitaries depended upon the rank of the latter.

Lie (lē), JONAS LAURITS IDEMIL, poet and novelist, born at Ecker, Norway, in 1833; died in 1908. He studied and practised law, but devoted his life to literature and became one of the most popular of recent Norwegian writers. His books include *The Pilot and His Wife*, *The Clairvoyant*, and other novels; *Grabow's Cat* and *Lystige Knur*, comedies; *Digte*, poems, etc.

Lieber (lē'bėr), FRANCIS, a Germano-American writer, born at Berlin in 1800; died at New York in 1872. In youth he served as a volunteer, and fought at Ligny and Waterloo. On the termination of the war he again took up his literary studies, and in 1821 obtained his degree at Jena. Getting into trouble with government on account of his liberal opinions, he went to London in 1826, and the following year to America, where he edited the *Encyclopædia Americana*, based on the German *Conversations-Lexikon*. The South Carolina College, Columbia, elected him in 1835 professor of history and political economy, a post he held until 1856, when he accepted a similar appointment in Columbia College, New York. He wrote many books and pamphlets on morals, education and political economy.

Liebig (lē'bi*h*), JUSTUS, BARON VON, one of the most eminent of modern chemists, born at Darmstadt in 1803; died at Munich in 1873. At the age of sixteen he entered the University of Bonn, and afterwards that of Erlangen, where, in 1822, he gained the degree of Doctor of Philosophy (Physical and Mathematical Sciences). At the expense of the Grand Duke of Hesse he repaired to Paris to complete his studies. He first secured the attention of the chemical world in 1824 by reading a paper before the French Academy of Sciences on fulminic acid and the fulminates, the true composition of which were until then unknown. This also gained him the favor of Humboldt, and through the latter's influence he was appointed extraordinary, and in 1825 ordinary professor of chemistry at the University of Giessen, a chair he held for 25 years. In 1850 he replaced Professor Gmelin at Heidelberg, and in 1852 he accepted the chemistry chair at Munich, with charge of the laboratory. The Munich Academy of Sciences elected him president in 1860. The results of Liebig's labors were generally given in the scientific reviews of the time, but chiefly in his own organ, *The Annalen der Pharmacie*, in the *Transactions* of the Royal Society of London, and the *Mémoires de l'Académie des Sciences*. Liebig is regarded as the founder of organic chemistry, owing to the many discoveries he made in this department. He did much to improve the methods of analysis; his *Chemistry of Food* has brought about a more rational mode of cooking and use of food; while agriculture owes much to his application of chemistry to soils and manures. The Grand Duke of Hesse created him an hereditary baron, and he received many honors from universities and learned societies of Europe and America.

Liechtenstein (lē*h*'ten-stīn), a small principality, practically a portion of the Austro-Hungarian monarchy, between Vorarlberg, Tyrol and Switzerland; area, 68 square miles. Pop. 9477. The surface has a fertile soil, yielding abundance of pasture, corn, wine, fruit and flax. The chief place, Vaduz, has about 1000 inhabitants.

Liège (li-āzh; Flem. *Luik;* Germ. *Lüttich*), a town of Belgium, capital of the province of same name, 54 miles east by south of Brussels. It is picturesquely situated on both sides of the Meuse, the larger part rising on heights above the river on the left bank, opposite the influx of the Ourthe. It dates from the sixth century, was once strongly fortified, and still has a citadel and another fort. Liège is the principal manufacturing town of Belgium, its foundries, firearm, metal and tool manufactures being very extensive; besides these there are important woolen mills, tanneries, and printing offices. It has many fine examples of Gothic architecture, including its cathedral, the Church of St. Jacques, and others, and its public buildings are mostly elegant structures. The town is rich in collections of various kinds, and has a university with a large library. The older parts have narrow and dirty streets, but these are being rapidly replaced by large thoroughfares and handsome buildings. Pop. 168,532.—The province has an area of 1117 square miles, with a population of 863,254. Until 1795 it was an independent state, governed by *prince-bishops* of the German Empire; in that year France included it in the department of the Ourthe, but it was restored to Belgium in 1815, excepting certain portions annexed to Prussia.

Liegnitz (lē*h*'nits), a town of Prussia, in the province of Si-

lesia, 40 miles W. N. W. of Breslau. It is an old but well-built town, defended by a castle, and surrounded by a boulevard planted with fine trees. It contains interesting churches, schools, and other public buildings. Its manufactures include machinery and hardware, pianos, gloves, woolens, cottons and linens, hosiery, etc. Pop. 59,710.

Lien (lī'en, or lēn), in law, in its most usual acceptation, signifies 'the right which one person, in certain cases, possesses of detaining property placed in his possession belonging to another, until some demand which the former has is satisfied.' In the United States liens are of two kinds: (1) *specific liens*, that is, where the person in possession of goods may detain them until a claim, which accrues to him from those *identical* goods, is satisfied; (2) *general liens*, that is, where the person in possession may detain the goods, not only for his claim accruing from them, but also for the general balance of his account with the owners. An important class of liens has also been created by statute. They are called mechanics' liens, and give to men who labor, or who furnish labor or material for the erection or repair of buildings, a lien upon such buildings. This class of liens is irrespective of possession.

Lieou-Kieou. See *Loo-Choo.*

Lieutenant (lef-ten'ant, lū-ten'ant; French *lien*, place, *tenant*, holding), in military language, the officer next below a captain. First and second lieutenants exist in the American and British armies. A lieutenant in the navy is the officer next in command to the captain of a ship. He takes rank both in the United States and British services with a captain in the army.

Lieutenant, Lord, of a county, in Great Britain, an officer appointed by the crown, the permanent and chief local representative of the sovereign. The office is supposed to have been instituted about the reign of Henry VIII. He appoints a certain number of duly qualified deputy-lieutenants, these appointments being subject to his majesty's approval; he also nominates to the lord chancellor persons to serve as justices of the peace for the county, the latter being also subdeputy lieutenants. He may also recommend for first commissions in the reserve forces. He is *ex officio* a member of the County Council.

Lieutenant-colonel, in the regular army, is the officer next in rank to a colonel, and the senior of a major. He has actual command of a regiment, and is responsible for the discipline and comfort of the troops under his command, and for the various details of their organization.

Lieutenant-general, a general officer in the army, ranking above a major-general and below a general.

Life (līf). To give an unobjectionable definition of life is impossible, as whatever the definition may be it will probably err either from redundancy or defect. Life has been defined as: 'the sum total of the forces that resist death,' 'the constant uniformity of internal phenomena with diversity of external influences,' 'the special activity of organized bodies,' 'organization in action,' 'a collection of phenomena that succeed each other during a limited time in an organized body,' 'the twofold internal movement of composition and decomposition, at once general and continuous.' Herbert Spencer's conception of life is: 'The definite combination of heterogeneous changes, both simultaneous and successive, in correspondence with external coexistences and sequences.' Mr. G. H. Lewes suggests the definition: 'Life is a series of definite and successive changes, both of structure and composition, which take place within an individual without destroying its identity.'

Life-assurance. See *Insurance.*

Life Boat, a boat for saving persons from shipwreck. The first life boat was patented in Great Britain by Lukin in 1785, but Henry Greathead introduced an improved form in 1789 which proved very successful, and till 1851 was almost the only one in use. It is recognized that a life boat, to be effective, should possess the following characteristics: 1. Great lateral stability, or resistance to upsetting. 2. Speed against a heavy sea. 3. Facility for launching and taking the shore. 4. Immediate self-discharge of any water breaking into her. 5. The power of self-righting if upset. 6. Strength. 7. Stowage-room for a large number of passengers. The life boat transporting carriage is an important auxiliary to the boat. The life boat is kept on this carriage in the boat house ready for immediate transportation to the spot most favorable for launching to the wreck. In this way a greater extent of coast can secure the benefits of the life boat than could otherwise be the case: besides, a boat can be readily launched from a carriage through a high surf, when without a carriage she could not be got off the beach. The machine is admirably contrived, and the boat may be launched

Section of McLellan Apparatus Carriage.
Atlantic City Stn. - Ready to fire gun.

Firing Lyle Gun.
(Atlantic City Station.)

36-ft. U.S.L.S.S. Power Lifeboat.

Launching Life-Boat.

APPARATUS AND WORK OF THE UNITED STATES LIFE-SAVING SERVICE

from it in an upright position with her crew on board. The Lifesaving Service of the United States is supported by government funds, and the Atlantic and some of the lake coasts are now studded with lifesaving stations, provided with suitable boats, appliances and houses of refuge for the saved.

Lifebuoys, Liferafts, Lifebelts.

Various kinds of buoys or other apparatus for the preservation of human life in cases of shipwreck or danger from drowning in other circumstances have been introduced from time to time, constructed in all sorts of shapes and materials. India rubber has been largely used in the construction of lifebuoys, generally in the form of belts which can be easily inflated by the wearer in the course of a few seconds. They are very buoyant and portable, but easily punctured or torn, and soon decay if put aside while damp. Hence the interior has come to be divided into cells, so that the rupture of one effects only a partial damage. Another sort is in the form of a waistcoat; and inflated pillows and mattresses made on the same principle have been found very effective. Naval officers have also strongly recommended mattresses stuffed with cork. The lifebuoy most favored by seamen of late years is composed of slices of cork so neatly arranged that they form a buoyant zone about 32 inches in diameter, 6 inches wide, and 4 inches thick. It contains about 12 lbs. of cork, is compactly covered with painted canvas to protect it from being injured by the water, and furnished with looped lifelines, that several, if necessary, may at once have a convenient hold.

Life Estate, in common law, an estate or interest in real property for life.

Lifeguards. See *Guards.*

Life Insurance. See *Insurance.*

Life-rockets, projectiles by means of which a rope is thrown either from a ship in distress to the shore, or from the shore to the ship, generally the latter. The most reliable missiles are those that are discharged from a mortar or gun by gunpowder, having a line attached to them. The *life-mortar* of Captain Manby, invented in 1807, is practically still that in use, though variations in details have been made on it from time to time. His missile was a shot with curved barbs, resembling the flukes of an anchor, to grapple the rigging or the bulwarks of a ship. An ingenious rocket-apparatus now in use is Rogers's life-anchor. It consists of a three-fluked anchor, 12 lbs. in weight, having the flukes so hinged that they pack closely together. When the anchor has been shot out from a mortar 100 or 200 yards, the flukes open and fasten to the beach or to a ship, and thus establish a communication between the two for dragging boats or men ashore. The best lines are those made of loosely-spun Italian hemp. There are several ways of arranging or *faking* the line so that it may run out quickly without kinking or entangling. The sling lifebuoy, or breeches buoy, is employed in conjunction with the rocket apparatus, after communication has been established by a rope from the shore to the vessel. It consists of a circular cork lifebuoy, having a pair of canvas breeches attached to it. The legs of the occupant protrude below the breeches, while his armpits rest on the buoy. The shipwrecked are by this means brought to the shore one by one, the buoy being drawn backwards and forwards by means of a traveling block. Or the lifecar, a sort of covered boat, may be used to convey the men ashore. In the United States the management of the life-rocket apparatus is under the control of the Lifesaving Service. The stations surround all parts of the Atlantic and lake coasts, presided over by a general superintendent, with headquarters at Washington. They are supported by appropriations made by Congress. On the Atlantic beaches the stations are located five miles apart.

Lifesaving Service, a branch of the United States Treasury Department, organized in 1871 and exceedingly useful in saving the crews and passengers of vessels wrecked on the coast. In 1910 there were 280 lifesaving stations on the ocean, and gulf coasts, and one at the falls of the Ohio, Louisville, Kentucky. Since the introduction of the system more than 22,000 persons and $225,000,000 value in property have been saved. Life boats, life lines and buoys, etc., are the chief appliances used.

Liffey (lif'fi), a river of Ireland, which rises in County Wicklow, runs W. into Kildare, then turns N. E. and passes through the county and city of Dublin into the Irish Sea; length, 50 miles. See *Dublin.*

Lifts. The term employed in Britain for the lifting apparatus known in the United States as elevators. See *Elevators.*

Ligament (lig'a-ment), in anatomy, the strong, tendinous, inelastic white bodies which surround the

joints, and connect bones, or strengthen the attachments of various organs, or keep them together. Every joint is surrounded by a capsular ligament; the tendons at the wrist and ankle are bound down by what are called the annular ligaments. In dislocations of joints the capsular ligament is often broken.

Ligan. See *Flotsam.*

Light (līt), the agent which enables us through the organ of sight to take cognizance of objects; it has a heating and chemical action which is all-important to animals and plants; without it there would probably be neither animal nor plant life. The sun, the fixed stars, nebulæ, certain meteors and terrestrial bodies in a state of incandescence or phosphorescence are self-luminous. The origin of light has been explained by two main theories, the *emission* or *corpuscular* theory adopted and developed by Newton, and the *undulatory* or *wave* theory, the fundamental principles of which were laid down by Huygens and Euler. Newton held that the sun and other light-giving bodies threw off, with immense velocity, vast numbers of exceedingly minute particles of matter, which passed into space, and by their mechanical action upon the eye brought about the sensation of light. Numbers of distinguished men accepted this theory, and many of the phenomena of light were plausibly explained by it. Huygens suggested that light was due to some sort of wave motion transmitted through a medium. His theory, offered towards the end of the seventeenth century, made little progress until the beginning of the nineteenth century, when its truth was amply established by the labors of Young, Fresnel and others; and it is now universally accepted. Though we are warranted in recognizing the existence of the transmitting medium called ether, of its nature we are as yet largely in ignorance. Rays of light proceed in straight lines, and when a screen is removed to twice or three times its distance from a luminous point it receives only one-fourth or one-ninth of the light per unit of area which it received formerly. This is the law of inverse squares, viz., the intensity of the light received from a luminous point is inversely proportional to the square of the distance from the point. Advantage is taken of this fact in determining the relative illuminating powers of two sources of light by means of the photometer. In 1676 Roemer discovered that light is not instantaneously propagated from luminous bodies to the eye; and he calculated its velocity. Bradley, Foucault, Fizeau, Cornu, etc., made similar measurements, and it has been determined that light travels at the rate of about 186,000 miles per second.

When light falls upon the surface of a body part of it is reflected. When the surface is smooth and regular an eye placed to receive the reflected rays generally observes an image of the source of light, and the surface may be called a mirror. When it is not smooth the light which falls upon it is scattered in all directions, so that the surface itself becomes visible; planets and nearly all terrestrial objects become visible in this way by means of reflected solar light. While part of the light which falls upon the surface of a body is reflected, part enters into the body, which absorbs or destroys a certain amount of it and may allow the rest to pass through. When light falls nearly vertically on a glass surface very little of it is reflected, but as the incidence becomes more and more oblique a steadily increasing proportion of the light is reflected. Polished metals, particularly silver, are good reflectors of light at all incidences, and hence metallic surfaces are most commonly used as mirrors. The law of reflection was known to Archimedes; it is—the incident and reflected rays make equal angles with a perpendicular to the surface, and lie in the same plane with it. When a ray has passed obliquely from air into water, although in the water as in the air it is a straight line, this is not a mere continuation of its old path; it is bent to some extent at the point where it enters the new medium, the bending of the ray being called *refraction.* This bending of a ray when it passes from one medium, such as air, into another homogeneous medium, such as glass or water, or from air into denser air, is subject to a particular law. The law of refraction was discovered in the seventeenth century; it is—whatever be the obliquity of a ray passing from one medium to another, the sines of the angles made by the incident and refracted rays with the perpendicular to the refracting surface are in a constant ratio, which has been called the *index of refraction.* When a ray of light passes through a medium, such as the atmosphere, which continuously varies in density from place to place, its direction continuously changes, so that it is a curved line, a fact to which the phenomenon of the mirage is due. The application of mathematics to the two laws of reflection and refraction is called *optics:* this science includes the formation of images by mirrors and lenses, the eye, microscopes, telescopes, etc. See *Optics.*

Newton found that red light is not so

Type of first U.S. Life-Saving Station.

Ready for Boat Drill.

McLellan Beach Apparatus Carriage.

Beach Apparatus Drill.

much refracted as blue light when it passes from one medium to another. When a ray of solar light is refracted in passing through a glass prism he found that a great number of rays of different colors left the prism, the blue ray being most bent from its former path and the red ray least. (See *Prism*, *Rainbow.*) Letting these rays fall upon a screen he obtained a band of colors which he called a spectrum. Thus he had decomposed solar light and found it to consist of a mixture of lights of every gradation of refrangibility. On permitting all the colored rays to pass through a lens before falling on the screen they combined and became white light again. Newton failed to observe one peculiar feature of the spectrum which has since been studied, and has led to important results—namely, that it was not really continuous, but was crossed by a number of dark lines. From this has arisen the instrument called the *spectroscope* and the branch of physics called *spectrum analysis.* See these words.

In Newton's experiment with solar light and the prism we find that the blue and green rays very slightly affect a thermometer, the yellow rays affect it slightly, and the extreme red rays possess great heating properties; moreover, when the thermometer is passed beyond the red into a space in which there are no luminous rays a maximum heating effect is produced. Again, the red and yellow rays are all but incapable of blackening photographic paper, whereas the blue and violet rays exert a rapid chemical action, and this is even exceeded by the invisible rays beyond the violet. It is evident then that (1) some of the solar rays which pass through the prism do not affect the retina; these rays are either less refrangible than red light, or are more refrangible than violet; (2) the least refrangible solar rays possess most heating power; (3) the most refrangible rays are capable of exerting the most powerful chemical action. As glass prisms absorb many of the heat rays it is convenient to use prisms of rock salt in examining the heat (red) end of the spectrum.

Young showed that two rays of light may destroy each other's effects and produce darkness. He applied this discovery to the explanation of many natural phenomena, such as the colors in mother-of-pearl, on soap-bubbles, etc. It has also been shown that rays of light may bend round obstacles. When a ray of light enters Iceland spar it divides into two rays, which travel in different directions; these two rays possess peculiar properties which are not exhibited by ordinary rays of light, and are said to be *polarized.* These polarized rays cannot be made to interfere or destroy each other's effects, but either of them may be divided into two interfering rays. These and other allied phenomena are accepted by physicists as proofs that (1) there exists throughout all space a very elastic medium of small density, known as the *ether;* (2) the particles of all bodies are in a state of vibration; a rise in temperature of a body indicates an increase in the rapidity of vibration of its particles; (3) radiation of heat consists in the transmission of these vibrations from the particles of a body through the ether to all parts of space; (4) when these vibrations communicated by the ether become rapid enough they are able to affect the retina of the eye and are then called light; (5) lights differ in color when their vibrations are not executed in equal times; (6) the vibrations of particles of the ether are all executed at right angles to the direction of propagation of the light; (7) in a ray of polarized light the vibrations are all executed at right angles to a certain plane called the plane of polarization; (8) the planes of polarization of the two rays in Iceland spar mentioned above are at right angles to one another.

Light, Aberration of. See *Aberration.*

Light, Artificial, any kind of illuminant for supplementing the light of the sun. Some form of artificial light must have been in use for domestic purposes from the very earliest times, but though large cities and a high state of civilization existed among the Egyptians, Greeks and Romans, the systematic lighting of streets was unknown to them. From the writings of Libanius, however, who lived in the beginning of the fourth century after Christ, we may conclude that the streets of his native city, Antioch, were lighted by lamps, and Edessa, in Syria, was similarly illuminated about A.D. 500. Of modern cities Paris was the first to light its streets. In the beginning of the sixteenth century it was much infested with robbers and incendiaries, so that the inhabitants were ordered, in 1524, to keep lights burning after nine in the evening, before all houses fronting a street. In 1558 *falots* (a large vase filled with pitch, rosin, and other combustibles) were erected at the corners of the streets. In London in 1668 the inhabitants were instructed to hang out candles. A more definite order was issued in 1690. Every housekeeper was required to hang a light or lamp, every night, as soon as it was dark, between Michaelmas and Ladyday, and to keep it burning till the hour of twelve at night. Successive acts of

Parliament and orders of the common council provided from time to time for the better lighting of London. The Hague commenced street lighting in 1552, Hamburg in 1675, Berlin in 1679, Copenhagen in 1681, Vienna in 1684, Hanover in 1696, Leipzig in 1702 and Dresden in 1705. The application of coal gas to economical purposes by Murdoch in 1805 opened a new era in artificial lighting. The United States cities came later into the field of efficient lighting, gas not being used for street lighting for years after it had been introduced in England. The development of electric lighting, however, has proceeded more actively here than elsewhere, and within recent years the brilliancy of street, store and house lighting has made phenomenal progress. The illuminating power of coal gas has been greatly increased by use of the Welsbach mantle, and acetylene gas has been found to yield a brilliant light. See *Electric Light*, *Gas*, *Paraffin*, *Petroleum*.

Light Cavalry, or HORSE. See *Cavalry*.

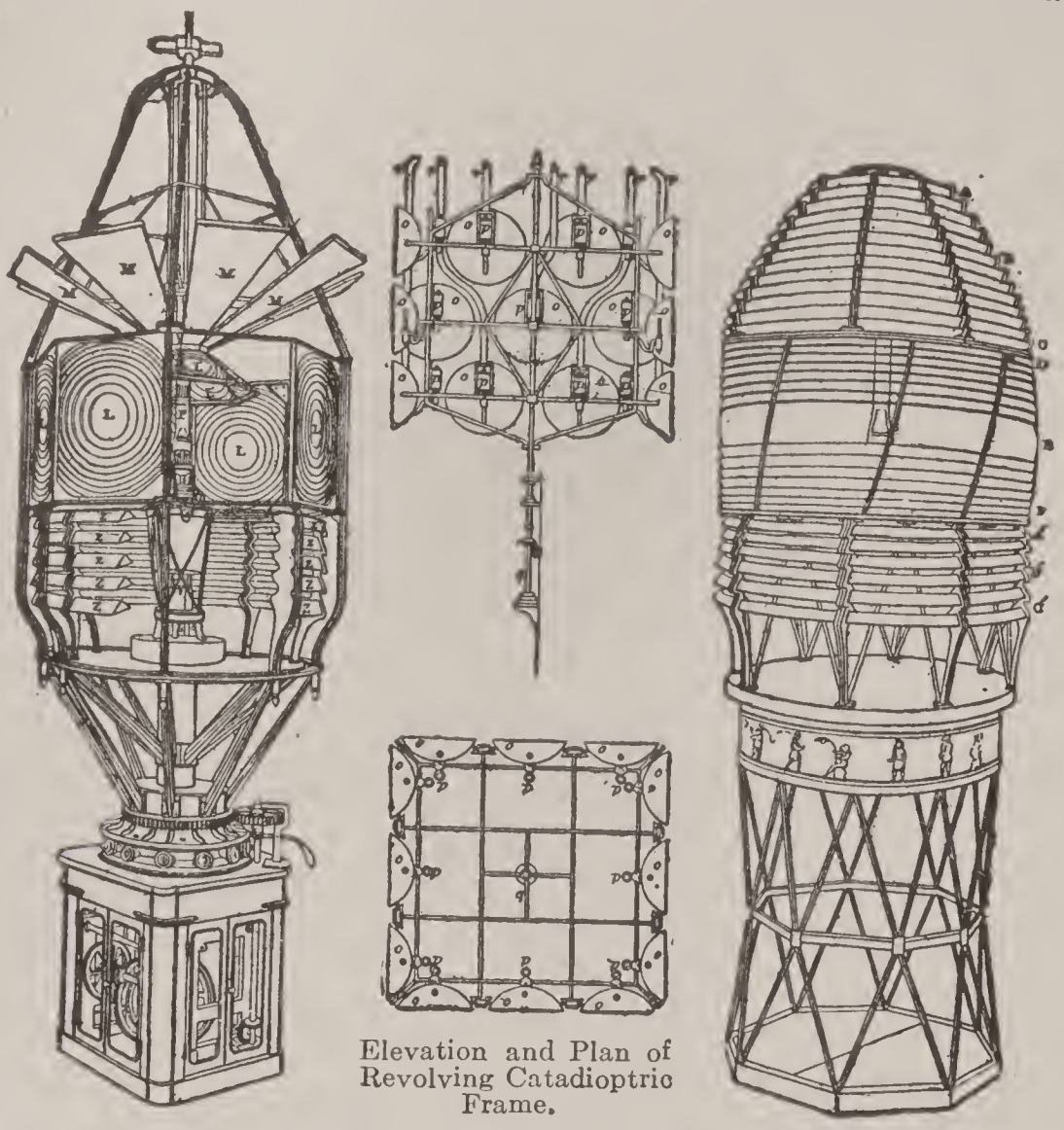
Light, ELECTRIC. See *Electric Light*.

Lighter (lī'tėr), a large, open, flat-bottomed vessel, employed to carry goods to or from a ship.

Lightfoot (līt'fụt), JOHN, an English divine and Hebrew scholar, born at Stoke-upon-Trent in 1602; died at Ely in 1675. He was educated at Cambridge. He held various livings, and in 1655 became vice-chancellor of Cambridge; but his claim to notice rests chiefly on his great knowledge of rabbinical literature and Hebrew antiquities, and his able Biblical criticism. Of his writings the *Horæ Hebraicæ et Talmudicæ*, etc., are the most important.

Lighthouse (līt'hous), a tower or other lofty structure with a powerful light at top, erected at the entrance of a port or on some rock or headland, and serving as a guide or warning of danger to navigators at night. The Pharos of Alexandria, founded about 300 B.C., is the earliest building erected expressly as a lighthouse of which we have any authentic record. It is stated to have been 550 feet high. Lighthouses are supposed to have been erected by the Romans at Flamborough Head, Dover and Boulogne. In modern times the first important lighthouse erected was the Tour de Cordouan, at the mouth of the Garonne in France, founded in 1584 and completed in 1610, altered and improved in 1727. It is 197 feet in height, and in architecture surpasses all other lighthouses in the world. The first sealight on the British coasts, for which a toll was leviable, was that of Dungeness, for which letters patent were granted by James I shortly after his accession. Until about 1676 nearly all the lighthouses were provided by private persons; subsequently they began to be built by the corporation known as Trinity House, and an act passed in 1836 empowered the corporation to purchase all private lights. In the United States the lighthouses are under the Lighthouse Board, which has charge of all buoys, beacons, etc., on the coasts and waters of the States. The earlier lights were simply of wood, and later fires of coal exposed in open chauffers upon the top of a tower. When oil was first introduced as an illuminant is not known. An immense improvement in lighting was made a few years previous to the French Revolution by the introduction of parabolic reflectors, which concentrate and throw forward in a horizontal direction the rays of light proceeding from lamps placed in their foci. At the same time the revolving frame carrying the lamps and reflectors was introduced, and has proved of the greatest utility in establishing a distinction between lights. The reflectors are composed of sheet-copper plated with silver, and formed into a parabolic curve by a laborious and delicate process. This mode of lighting is termed the *catoptric* or *reflecting* system. It is so called in opposition to the *dioptric* or *refracting* system, in which the illumination is produced by a central lamp, the rays from which are transmitted through a combination of lenses by which it is surrounded. The adoption of lenses in lighthouses, though suggested as far back as the middle of the last century, was first carried into practical effect in 1788 by M. Augustin Fresnel, a distinguished French savant. The superior advantages which this system has been found to possess over that of reflectors has led to its general adoption in most lighthouses. Fresnel likewise contrived a combination of the two systems, the apparatus in which consists of thirteen rings of glass of various diameters, arranged one above another in an oval form. The five middle rings form a cylindrical lens through which the rays from the central lamp are transmitted by *refraction*, while the other rings or prisms, five of which are upper and three lower, are constructed in such a manner as to project by *reflection* the light from the focus in a direction parallel with the refracted rays. The light thus obtained is termed the *catadioptric* light. A modification of the dioptric and catadioptric systems, so as still further to prevent the loss of the rays of light, and thereby increase the in-

tensity of their resultant beam, was introduced by Mr. Thomas Stevenson under the designation of the *holophotal* system, its object being to effect the useful application of the *whole* of the light. The catoptric, dioptric and catadioptric systems are illustrated in the accompanying



Revolving Dioptric Apparatus. LIGHTHOUSE. Fixed Catadioptric Apparatus.

Elevation and Plan of Revolving Catadioptric Frame.

figures. In the first the reflectors *o o* are shown as arranged on the revolving frame, *p p* being the oil-lights, *r r* copper tubes conveying away the smoke. In the dioptric apparatus F is the light, L L L′ L′ are lenses, M M plane mirrors reflecting the rays falling on them in a horizontal direction, Z Z zones or belts of glass prisms. In the other figure ABC, A′B′C′, are respectively upper and lower zones of prisms, D E F the cylindric refracting belt. Various means of exhibiting the light have been adopted, so as to make a distinction between different lighthouses. Thus the *flashing* light shows five or more flashes and eclipses alternately in a minute; the *fixed* light has a white or red flash in addition, at intervals of several minutes; in the *revolving* light the light gradually increases to its full effect, then decreases till it is eclipsed. Other methods add to the diversity of lights, as the *intermittent*, the alternate, etc.

Oil, particularly paraffin, has long been employed, and it is likely to remain in use in isolated lighthouses. Gas was the first substitute for oil. With it an eclipse can be simply produced by a partial stoppage in the supply pipes, and there is no such waste of light as when oil is employed. A burner for gas invented by Mr. J. R. Wigham presents a total of 108 jets arranged in concentric circles. Gas has been successfully employed in illuminating buoys for the guidance of vessels. The buoys (which, of course, are gas and water-tight) are charged to a pressure of perhaps ten atmospheres, giving a continuous light for three of four months; a luminous paint has also recently been applied with advantage to buoys. The electric light has been more recently adopted, and experiment proves it to be the most powerful and penetrative of all lights, too much so in some cases, as its

intensity is apt to be blinding when vessels are near at hand. It has not yet been demonstrated that oil as an illuminant has been especially improved upon. In the United States the reliability of oil has been fully demonstrated and the conclusion reached that vaporizing the oil and using it to heat incandescent mantles of refractory materials is the most efficient and economical method. Buoys have been placed in the Ambrose channel to New York harbor in which acetylene is the illuminant used. It has proved very satisfactory. The *Eddystone* and *Bell Rock* are the two most celebrated British lighthouses. Among lighthouses, built under peculiar difficulties of construction is the Tillamook Rock light station, opposite Tillamook Head, Oregon. Opposite Crescent City, Cal., at Northwest Seal Rock, the difficulties were even greater. In Delaware Bay, on a shoal known as Fourteen-foot Bank, an extremely difficult foundation was overcome. The most powerful light in the world is that of the great lighthouse on Heligoland Island, Germany, in the German Ocean, opposite the mouth of the Elbe. It has an electric installation with three search-lights, its 40,000,000 candle-power being without a rival.

Lightning (līt'ning), a flash of light resulting from a sudden discharge of atmospheric electricity. It may be a diffused reddish white or violet flash, seemingly spread over a considerable extent of the sky, or a zigzag or rather sinuous line of very brilliant light, resulting from a discharge between two clouds or between a cloud and the earth. *Heat* or *sheet lightning* is unaccompanied by thunder; it is now generally held to be the reflection from aqueous vapor and clouds of a discharge occurring beyond the horizon. Sometimes during a thunderstorm *fireballs* are seen, but no exact observations of them have yet been made. Experiments show that the duration of a flash of lightning is inconceivably small, in some instances not more than a millionth part of a second. The *spectrum* of lightning shows the presence of incandescent nitrogen, oxygen, hydrogen and sodium. Certain electroscopic experiments seem to show that previous to a discharge between two clouds internal discharges are taking place in both. Lightning in passing through air and non-conductors, metallic rods, etc., exhibits all the phenomena of the passage of a very great quantity of electricity; it kills animals, splits trees and stones, and melts thin wires. Sometimes on entering the earth the lightning melts the siliceous substances in its way, producing the tubes called *fulgurites*. After a lightning discharge the peculiar odor of ozone may be observed, as in the neighborhood of an electric machine. Objects at a distance from a place of discharge may have previously been charged with electricity by the induction of the clouds; the distant discharge suddenly sets free this electricity so that it passes through the objects to the ground, producing a *return shock;* men and animals have often been killed in this way. A large number of photographs of lightning flashes from all parts of the world have been collected, and it is hoped that by their means many obscurities connected with the phenomenon will soon be cleared up. *Thunder* is due to the sudden disturbance of the air produced by a lightning discharge; the long, rolling effect is perhaps due to echoes from the clouds, perhaps partly to there being a number of discharges at different distances from the observer. Sound travels at ordinary temperatures about 1100 feet per second, so that a thunder-clap from a distance of one mile would reach us in about five seconds. See *Conductor*, *Electricity.*

Lightning-rod. See *Conductor.*

Lightship, or LIGHTBOAT, a vessel, usually single-masted, serving as a lighthouse in positions where a fixed structure is impracticable. Octagonal lanterns, fitted with Argand lamps placed in the foci of parabolic reflectors, are usually hoisted on the mast; but they are less efficient and more expensive in maintenance than land lights.

Lign-aloes. See *Aloes-wood.*

Lignine (lig'nin), a modification of cellulose (which see).

Lignite (lig'nīt), or BROWN COAL, compressed and altered vegetable matter intermediate in its qualities between peat and coal. It occurs in the tertiary strata in many European countries, occasionally in thick beds, as in Germany and France, and vast deposits of it exist in the Western United States, especially in North Dakota and Montana. Texas and New Mexico also are abundantly supplied with lignite and other grades of subbituminous coal, the total supply in the United States, exclusive of Alaska, being estimated at 740 billions of tons. Alaska has also a large supply. This coal was long deemed useless for steam-making purposes, but it has recently been found that, by converting it into producer gas, it is capable of yielding more power per ton than the higher grades of coal. This gives immense future value to the American deposits.

Lignum Vitæ. See *Guaiacum.*

Ligny (lēn-yē), Battle of, June 16, 1815. See *Quatre-Bras* and *Waterloo.*

Ligula (lig′ū-la), Lig′ule, in botany, a strap-shaped petal of flowers of the order Compositæ; also the membrane which occurs at the base of the lamina of a grass leaf, as that of millet.

Liguria (li-gū′ri-ä), one of the larger divisions (compartimenti) of Italy; area, 2037 square miles. It includes the towns of Genoa, Spezzia and St. Remo, and is the most important maritime division. The Roman Liguria was much more extensive. The Republic of Genoa existed as the *Ligurian Republic,* under a democratic constitution granted by Bonaparte, from 1797 to 1805, when it was annexed to France. From 1814 to 1860 it formed part of the Kingdom of Sardinia.

Ligurite (lig′ū-rit), a variety of sphene, a mineral occurring in oblique rhombic prisms, of an apple-green color, occasionally speckled externally; so called on account of its being chiefly found in Liguria. Its color, hardness and transparency have caused it to be classed as a gem.

Ligustrum. See *Privet.*

Li-Hung-Chang, a Chinese statesman, was born in 1823. He was viceroy of China when, with Gen. Gordon, he suppressed the Taiping rebellion, 1860. He held other high posts, made the treaty of peace with Japan after the 1895 war, and in 1898 was deposed from his post of grand chancellor. Twice he visited Europe and was once in the United States, where he attracted much notice. In 1899 he was restored to his former dignity, and died in 1901. He was most frequently looked upon as one of the leading diplomatists of his time.

Lilac (lī′lak; *Syringa vulgaris,* nat. order Oleaceæ), a familiar fragrant-flowered shrub, 8-10 feet high, is a native of Southeastern Europe and Asia, and is widely planted in the United States, being one of the most familiar and most beautiful of our spring-flowering ornamental shrubs. There are several varieties, the most common color of the flowers being lilac, but there are also some white ones.

Lilburne (lil′burn). John, a celebrated English sectary, born in 1618; died in 1657. For tracts against the Anglican hierarchy he was whipped and imprisoned in 1637, but the Long Parliament released him in 1640. His friends got the conviction declared illegal and tyrannic. and Lilburne received £3000 as indemnity. He then joined the army, and rose to the rank of lieutenant-colonel. He was one of the party known as the *Levelers,* and for his attacks on Cromwell and others was oftener than once sent to the Tower. Having been condemned to exile, and having returned without leave, he was put in prison and tried for his life, when he was acquitted, but not liberated for some time. Subsequently he became a member of the Society of Friends. Hume describes him as 'the most turbulent, but also the most upright and courageous of men.'

Liliaceæ (lil-i-ā′se-ē), the lilies, a large nat. order of endogenous plants. They are stemless herbs, or shrubs with a simple or branched trunk, with bulbous or fascicled roots. They have six hypogynous or perigynous stamens, with usually introrse anthers; a three-celled ovary, each cell being usually many ovuled, an entire style, and a capsular fruit. They are much more abundant in temperate climates than in the tropics, where they chiefly exist in an arborescent state. The lily, fritillary, hyacinth, star of Bethlehem, tulip, dragon-tree, squill, aloe, onion, garlic, etc., belong to this order.

Lilith (lil′ith), according to rabbinical legends, Adam's first wife, mother of giants and demons.

Lilium (lil′i-um). a genus of bulbous plants. See *Lily.*

Liliuokalani (lil-i-ū-ō-ka-la′ni), Lydia Kamekeha, ex-queen of Hawaii, born at Honolulu in 1838. She succeeded King Kalakaua in 1891 and at once sought to abolish the constitution and rule as an absolute monarch. This led to a revolt on the part of the American inhabitants and she was dethroned in 1892 and a republic founded. An attempt to regain her power failed, and she sought the United States, but returned to Hawaii in 1898, after its annexation by the United States.

Lille (lēl), a town of France, capital of the department Nord, and chief fortress of the northeast of France, near the Belgian frontier. It is remarkably well built; has spacious, regular streets, lined with large, massive houses of brick or stone, with the usual public buildings and institutions found in large cities. The Haute and Basse Deule, sluggish streams, traverse the town, and are connected by a canal, while the country around is so flat that for about 1½ miles it can be laid under water. Lille is the center of an extensive commerce. The manufacture of linen and cotton thread and fabrics is

the most important, but fine woolen cloth, velvets and carpets are also largely produced; in fact, the factories of Lille cover almost the whole range of textile goods. Chemicals, leather, machinery, paper, beet-sugar, etc., are also turned out in ever-increasing quantities. Lille originally belonged to the counts of Flanders. In 1667 it was taken by Louis XIV, and was fortified by Vauban. It was taken after a siege of several months by Eugene and Marlborough in 1708, but was restored to France by the Peace of Utrecht in 1713. In 1792 it was ineffectually bombarded by the Austrians. Pop. (1906) 196,624.

Lillibullero (lil-i-bul-lē′rō), originally, it is said, a watchword of the Irish Roman Catholics in their massacre of the Protestants in 1641; afterwards, the refrain and name of a political song popular during and after the reign of James II.

Lillo (lil′lō), GEORGE, an English dramatic writer, born in London in 1693; died in 1739. Although carrying on the trade of a jeweler, he found time to write a number of well-received pieces for the stage, distinguished by great knowledge of human nature and morality. The most successful of these was his domestic drama entitled *The London Merchant, or the History of George Barnwell*, 1731.

Lilly, LILY, or LYLY, JOHN, an English dramatic and miscellaneous writer, born about 1553, studied at Oxford and Cambridge. He wrote nine dramatic pieces which are now forgotten. He attempted to reform and purify the English language in two fantastic romances entitled *Euphues and his Anatomy of Wit* (1580), and *Euphues and his England* (1581), which met with great success.

Lilly, or LILY (lil′i), WILLIAM, an English astrologer, born in 1602; died in 1681. He assumed the role of prophet and seer, and the credulity of the age was such that he was consulted and believed in by high and low. In 1644 he first published his *Merlinus Anglicus*, which he continued annually until his death. He wrote a number of mystic books, which generally met with a ready sale. His autobiography is very entertaining. He not only acquired fame, but also a large fortune.

Lily (lil′i), a genus of plants, nat. order Liliaceæ. The root is a scaly bulb; the leaves simple, scattered, or verticillate; the stem herbaceous, simple, and bearing at the summit very large and elegantly-formed flowers. The flower consists of six petaloid sepals, the calyx and corolla being alike in form and color. There are many species, those best known in Europe being the white, orange and scarlet lilies, the tiger lily, etc. The common white lily (*Lilium candidum*) is a native of Syria, Persia, and other eastern countries. The finest American species is the *L. superbum*, which grows in marshes to the height of 6 or 8 feet, bearing reflexed orange flowers spotted with black. A well-known Japanese lily (*L. auratum*) is one of the noblest flowering plants in existence, and highly fragrant. *L. giganteum* grows to the height of 12 feet. In the middle ages and in modern times the white lily has been the emblem of chastity, hence the Virgin Mary is often represented with a lily in her hand or by her side.

Lilybæum (lil-i-bē′um), the name given by the ancients to Cape Bœo, the most western promontory of Sicily. The Carthaginians, about B.C. 350, founded here a town of the same name, which became their principal naval station in Sicily. See *Marsala*.

Lily-of-the-valley (*Convallaria majālis*), a plant of the nat. order Liliaceæ, distinguished for its small and beautiful bell-shaped flowers of an agreeable odor. It is found in Europe, Asia and North America. It is used in medicine as a heart stimulant, its active principle being convallamarin.

Lima (lī′ma), a city, capital of Allen County, Ohio, 71 miles N. of Dayton, is in the center of the Ohio oil field, with numerous oil wells and refineries in its vicinity. It has locomotive and car works, engine and boiler manufactories, and other industries. Pop. 30,508.

Lima (lē′ma), the capital of Peru, is situated at the foot of granitic hills, 7 miles from Callao, its port on the Pacific, on the small river Rimac. It is regularly built, and many of the streets have a stream of water running down the center. The numerous domes and spires give Lima a fine appearance from a distance, but the houses are mostly of unburnt brick. Among the public buildings and institutions the cathedral, the convent of San Francisco, the exhibition palace, and the university with its national library and museum, deserve special mention. The city has botanical gardens and a very large bull-ring. The manufactures are unimportant, but there is a considerable import and export trade through the port of Callao. The climate is very agreeable, but the locality is subject to earthquakes, the most destructive being that of 1746. Lima was founded in 1535 by Pizarro, and called Ciudad de los Reyes (City of the Kings). In January, 1881, during the war with Chile, Lima

capitulated to the Chileans, who occupied it thereafter for more than two years. Pop. 250,000.

Limasol (lē-ma-sōl′), or LIMIS′SO, a seaport of Cyprus, on the south coast, with a considerable trade. Pop. 8298.

Lima-wood, a name sometimes given to the wood of *Cæsalpinia echinata.* See *Brazil-wood.*

Limax. See *Slug.*

Limber. See *Gun-carriage.*

Limbourg, or LIMBURG (lim′burg), a province of Belgium, separated by the Maas from Dutch Limburg; area 942 square miles; pop. (1904) 255,359. Hasselt is the capital.

Limburg, a province of Holland, partly intersected by the Maas; area, 850 square miles; pop. 281,934. Agriculture and cattle-rearing are the chief occupations, and there is a large export trade in butter and cheese. The capital is Maastricht.

Limburg, a town of Prussia in the district of Wiesbaden, on the Lahn, with a fine old cathedral in the Romanesque style, recently restored. Pop. (1905) 9917.

Lime (līm), the oxide of the metal calcium. This oxide, which in a state of combination is one of the most abundant bodies in nature, has been known and used from the remotest antiquity. The forms in which it occurs native are very numerous, but it does not exist in a pure state in nature, its affinity for carbonic acid being such that it absorbs it from the atmosphere, when it becomes converted into carbonate of lime. Combined with carbonic, sulphuric, phosphoric and other acids it constitutes large rock masses, and even mountains; it is present in sea and other waters; it is a constituent of most soils and of a great number of minerals; and is essential to plants and animals.

Ordinary lime is obtained with most facility from the carbonate (see *Limestone*), from which by a strong heat the carbonic acid may be expelled. This process is conducted on a large scale with the different varieties of limestone, which are calcined or burned in order to obtain the caustic earth, or *quicklime*, as it is called. The lime thus obtained, however, is rarely pure enough for chemical purposes. Pure lime is a soft, white substance, of the specific gravity of 2.3. It is quite infusible, but when heated in the oxyhydrogen blowpipe it emits one of the intensest of artificial lights, and it has accordingly been employed for a signal light and for facilitating the observation of distant stations in geodetical operations. It is soluble in about 700 parts of cold water. The solubility is diminished by heat. If a little water be sprinkled on new burned lime it is rapidly absorbed, with the evolution of much heat and vapor. This constitutes what is known as slaking. The heat proceeds from the combination of the water with the lime, forming a *hydrate*, as the slaked lime is called. This is a compound of 56 parts of lime with 18 of water, or rather more than 3 to 1. The water may be expelled by a red heat. Lime-water is astringent, and somewhat acrid to the taste. It renders vegetable blues green, and yellows brown; and restores to reddened litmus its usual purple color. Lime, submitted to the action of galvanism in high intensity, afforded Sir H. Davy satisfactory evidence that, in common with the other earths, it consists of a metal, which he denominated *calcium*, and oxygen, the proportions being 72 of calcium and 28 of oxygen. (See *Calcium.*) Chlorine combines directly with lime, forming the very important substance used in bleaching, called *chloride of lime* or *bleaching-powder.* It is formed by passing chlorine gas over slaked lime. Chloride of lime is also used as a disinfectant.

The uses of lime are almost too numerous to mention, for there is hardly any operation in the arts for which lime is not at some part indispensable. In the manufacture of basic Bessemer steel (see *Steel*) it forms about one-half of what is called 'Thomas slag,' which, when ground, makes a cheap and efficient fertilizer; it is employed in the early stages of leather dressing to remove hair, fat, etc., from the hides; it is used in metallurgy as a flux; in soap-boiling to causticize the alkaline liquors; in the manufacture of washing soda; for neutralizing acids; for making mortars and cements; in agriculture to destroy inert or noxious vegetable matter, and to decompose heavy clay soils; and in the *materia medica*, chiefly as an antacid.

Lime, or LINDEN (*Tilia*, nat. order Tiliaceæ), a large tree, with alternate, simple, and cordate leaves, and sweet-scented flowers, disposed on a common peduncle. The common linden (*T. europæa*) is a well-known tree. The inner bark of all the species is very tenacious; it is called *bast*, and mats are made of it in Russia in large quantities. The wood is rather soft, close-grained, and much used by turners. The American lime, or bass-wood (*T. americāna*), is a large and beautiful tree, resembling the European species.

Lime (*Citrus limetta*), a small globular-shaped lemon, the fruit of a shrub about 8 feet high. It is a native of India and China, but was introduced into Europe long before the orange, and is now extensively cultivated in the south of Europe, the West Indies, and some parts of Southern America. The fruit is agreeably acid, and its juice is employed in the production of citric acid, in beverages, etc.

Lime Light. See *Oxyhydrogen Light.*

Limerick (lim'ėr-ik), a city of Ireland, capital of Limerick county, and a county of itself, is situated at the interior extremity of the estuary of the Shannon. It consists of three parts, connected by five bridges, one of which, the Wellesley Bridge, a magnificent structure crossing the harbor, cost £85,000. The principal buildings are the Episcopal and Roman Catholic cathedrals, savings bank, chamber of commerce, exchange, assembly house, linen hall and corn and butter markets. The industries include the curing of bacon, the preparation of butterine, flax spinning and weaving and lace making. There are distilleries, breweries, tanneries, corn mills, a large military clothing establishment, and shipbuilding slips. Limerick is the leading port on the west coast for the shipment of produce. Pop. 38,151.—The county belongs to the province of Munster; area, 1064 square miles. The surface is in general flat, or an undulating plain, excepting in the northeast, south and southwest, where it rises into mountains. The principal river is the Shannon, the estuary of which forms great part of the northern boundary. The occupations are chiefly agricultural; pasturage and dairy farming are most general. Large quantities of farm produce are exported. Pop. 146,098.

Limestone (līm'stōn), a species of mineral comprising numerous varieties of carbonate of lime, differing considerably in external appearance, structure and composition. It is, if pure, essentially composed of 57 parts of lime and 43 of carbonic acid; but in some rocks the limestone is intermixed with magnesia, alumina, silica, iron, etc. All limestones give readily to the knife. They are infusible; but when impure, by an admixture with a portion of other earths, they vitrify in burning. All limestones effervesce when a drop of strong acid is applied on the surface, and they dissolve entirely in nitric or hydrochloric acid. Limestone is found both in primary and in secondary rocks, but most abundantly in the last. It is also not uncommon in alluvial deposits, when it is called *calcareous tufa*. Limestone has frequently a granular structure; and the size of the grains is variable, in some degree corresponding with the relative age of the mineral. Thus limestone which occurs in beds in gneiss, has usually a coarse texture and large granular concretions; but when its beds exist in mica slate, or argillite, its texture becomes more finely grained, and its color less uniform. Silurian and Devonian limestones have a texture more or less compact; the colors are often variegated; and they often contain fossils. Secondary limestone has a compact texture, a dull fracture, and usually contains shells, and sometimes other organic remains. It is always stratified. The specific gravity of limestone varies from 2.50 to 2.90. Calcareous spar is the purest variety of carbonate of lime. It is frequently very transparent, and is then strongly double-refractive, this peculiarity being best seen in the variety known as *Iceland spar*. Among the varieties of limestone are: *calcareous spar, granular limestone, foliated limestone, compact limestone, oolite* or *roestone, peastone* or *pisolite*, etc. Compact limestone passes into *chalk* when the particles are somewhat loosely connected with each other, so that the whole assumes an earthy character. A variety of very fine-grained compact limestone is used in lithography, the best being that obtained near Pappenheim and Solenhofen in Bavaria. When sufficiently close in texture to admit of being polished limestone takes the name of marble. As such it is an important building material. The origin of limestone is very largely organic, immense quantities of lime, dissolved in sea-water, being abstracted to form the shells or hard portions of the numerous animals that inhabit it, crustacea, mollusca, zoöphites, and foramenifora. Chalk is mainly composed of the skeletory of microscopic creatures, and corals build limestone reefs of enormous magnitude, many oceanic islands being built upon a thick basis of this material.

Limit (lim'it), in mathematics, is a determinate quantity to which a variable one continually approaches in value. Thus if a polygon be inscribed in a circle, its area is of course less than that of the circle; but as the inscribed polygon is made to have more and smaller sides its area gets more nearly equal to that of the circle, though it can never quite equal it.

Limited Liability. See *Joint-stock Companies.*

Limnæa (lim-nē′a), a genus of freshwater, univalve, gasteropodous molluscs, having a lung sac instead of gills. They have the power of floating on their back, the foot forming a kind of boat. They are found in all parts of the world, and occur fossil, especially in the Wealden.

Limoges (li-mōzh), a town of Western France, capital of the department of Haute-Vienne, and former capital of Limousin. The most remarkable edifices are the cathedral; the bishop's palace, the finest modern edifice of the town; the town hall; and the public library. The principal industry is the manufacture of artistic porcelain, known as Limoges ware, and employing over 5000 hands. It is exported to all parts of the world. There are also wool and cotton spinning mills, cloth factories, foundries, paper mills and extensive shoe and clog-making establishments. In 1790, and again in 1864, whole quarters of the city were destroyed by fire. Pop. 75,906.

Limonite (lī′mo-nīt), a very important ore of iron, varieties of which are bog iron ore and brown hematite. It is a hydrated oxide of a brownish color, occurring in mammillated or botryoidal masses, and is found abundantly in Europe and America.

Limousin (li-mö-saṇ), an ancient province near the center of France, forming at present the chief part of the departments of Haute-Vienne and of Corrèze. Limoges was the capital.

Limoux (li-mö), a town of France, dep. Aude, on the Aude River. Pop. 5458.

Limpet (lim′pet), a gasteropodous mollusc which adheres to rocks partly by the suctorial powers of its broad disc-like foot and partly by a glutinous secretion. The common limpet (*Patella vulgāris*) is often found ensconced in a shallow pit excavated out of the rock, and which it has made or rasped out by the siliceous particles embedded in its foot. From this pit the limpet, when covered by the tide, makes short journeys in quest of its food, which consists of algæ, and which it eats by means of a long ribbon-like tongue covered with numerous rows of hard teeth. The limpet is used as bait, and is eaten by the poorer classes of Scotland and Ireland. In tropical seas limpets attain an immense size, one species having a shell about a foot wide.

Limpopo (lim-pō′po), or Crocodile River, a river of Southern Africa, which rises in the Transvaal not far from Pretoria, flows northwest, then northeast, forming for a considerable distance the boundary of the Transvaal, then southeast into the Indian Ocean north of Delagoa Bay; length about 1100 miles.

Lim′ulus. See *King-crab.*

Linaceæ (lin-ā′se-ē), the flax family, a small nat. order of exogenous plants, scattered more or less over most parts of the globe, those in temperate and southern regions being herbs, while the tropical representatives are trees or shrubs. They are principally characterized by their regular flowers, with imbricate glandular sepals having a disc of five glands outside the staminal tube; the ovary is three to five celled, with two ovules in each cell; the albumen is fleshy; the leaves are simple, usually stipulate, rarely opposite. The tenacity of the fiber and the mucilage of the diuretic seeds of certain species of *Linum*, such as the common flax (*L. usitatissimum*), are well known widely, and utilized. See *Flax.*

Linacre (lin′å-kėr), or Lynacer, Thomas, an eminent physician, born at Canterbury about 1460; died in 1524. After receiving his first education in his native town he entered Oxford University, afterwards proceeded to Italy, and on his return was intrusted by Henry VII with the education of Prince Arthur. He ultimately abandoned his medical practice for the church. In 1518 he founded the College of Physicians, of which he continued president till 1524. He made a Latin translation of the works of Galen.

Linaloe-wood (lin′a-lō), a wood obtained from tropical America (probably from a species of *Amyris*), yielding a fragrant oil used in perfumery.

Linares (lē-nä′rās), a town of Spain, province of Jaen, the chief town in a district rich in lead and copper mines. It has large smelting works and foundries and manufactories of explosives. Pop. 38,245.

Linares, a city of Mexico, State of Nuevo Leon, 65 miles S. E. of Monterey. Pop. 20,690.

Linares, an inland province of Chile, area 3942 square miles. It is fertile in the north but arid in the centre and has several volcanic peaks. Pop. 101,858. Linares, its capital city, has about 9000.

Linaria (li-nā′ri-a), a genus of monopetalous, dicotyledonous plants, of the nat. order Scrophulariaceæ.

Lincoln (ling′kon), a city of England and a county in itself, capital of Lincolnshire, 120 miles north

of London, situated on the Witham, and at the junction of several railways. It has been identified with the Roman Lindum Colonia, and at the time of William the Conqueror was a place of considerable strength and importance. The principal edifice is the cathedral, situated on a height (dating from the eleventh century, and restored since 1862), chiefly in the early English, but partly also in later styles, with a tower over 260 feet high, in which is the famous bell known as 'Great Tom of Lincoln,' cast in 1610, cracked in 1827, and since recast into a new bell. The other most conspicuous buildings are the Guild-hall or Stone-bow (of the time of Richard III), the remains of the castle which was founded by William the Conqueror, the old episcopal palace, and the fine old Roman arch spanning Hermin street, a theological college, and school of art, etc. The manufacture of agricultural implements and machinery forms the chief branch of industry. Pop. 57,294.—LINCOLNSHIRE is a large maritime county on the east coast, extending from the Wash to the Humber, which separates it from Yorkshire. Area, 2646 square miles. The surface is generally an uninterrupted plain, the greater portion of which lies below the level of the sea, being protected by embankments. In a few places the fens and marshes continue nearly in their natural state, but round the Wash a great deal of very fine land has been gained from the sea since the commencement of the nineteenth century and the embankments are gradually extending. In consequence of the richness of its pastures Lincolnshire has been long celebrated for its breed of horses, cattle and sheep. In the best parts of the fens and marsh under tillage the crops chiefly cultivated are oats and wheat. Principal rivers, Trent, Witham, Welland and Ancholme. The Witham has been made navigable from Boston to Lincoln; and the county is intersected by an intricate network of canals and dikes. Lincolnshire is divided into three parts—Holland, Kesteven, Lindsey. Pop. (1911) 564,013.

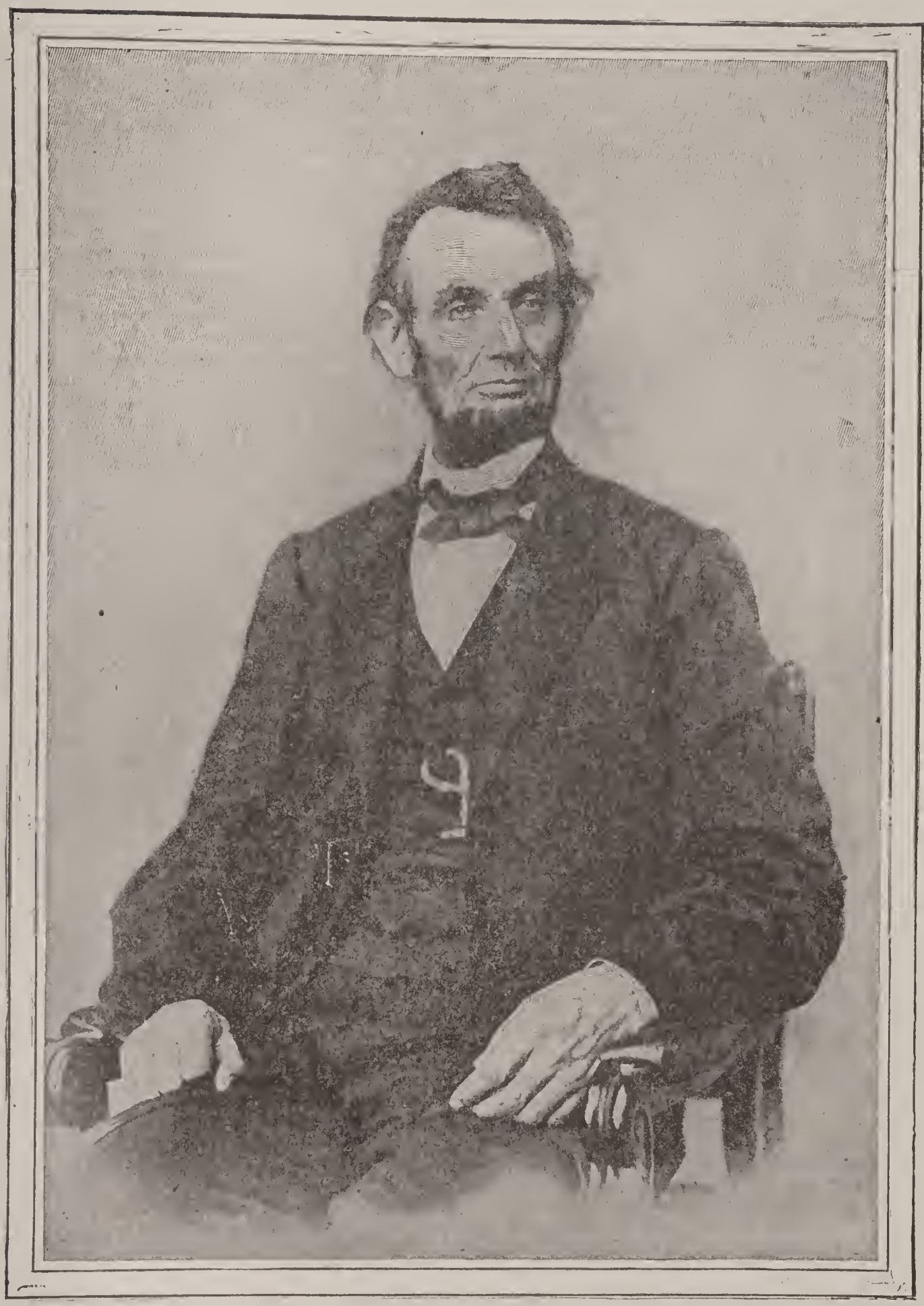
Lincoln, a city, capital of Logan county, Illinois, situated 28 miles N. E. of Springfield. It has the Lincoln University, founded in 1866, a State institution for feeble-minded children, and an Odd Fellows' orphans' home. Coal is mined, and mattresses, horse-collars, caskets, awnings, automobiles, etc., are made. Pop. 10,892.

Lincoln, a city, capital of the State of Nebraska, on the right bank of Salt Creek, a tributary of the river Platte. The public buildings include the revenue offices, courthouse and post-office in one building; State house, university, schools and churches. There are also a State asylum for the insane, the Nebraska University and Agricultural College, and other educational institutions. Near by are abundant saline springs and a beautiful salt lake. It has a large trade in all kinds of merchandise, grain, live-stock and lumber, and many flourishing manufactories; also large canning and packing houses. Pop. 43,973.

Lincoln, ABRAHAM, the sixteenth president of the United States of America; born in Kentucky in 1809. He removed with his family in 1816 to Spencer county, Indiana, and for the next ten years was engaged in labo-

Abraham Lincoln.

rious work of various kinds, having only about a year's schooling at intervals. On the breaking out of the Black Hawk war, in 1832, he joined a volunteer company, and as captain he served three months in the campaign. He next opened a country store, was appointed postmaster of New Salem, Illinois, began to study law, and at the same time turned amateur land surveyor. In 1834 he was elected a member of the Illinois legislature, to which he was again returned at the three following biennial elections, and in 1836 he was licensed to practice law. In 1846 he was elected a representative in Congress for the central district of Illinois, and voted steadily in Congress with the antislavery party. In 1849, and again in 1858, he was unsuccessful in attempts to enter the Senate, in the latter year having a famous controversy with Stephen A. Douglas, the Democratic candidate, in which he fixed his position regarding the institution of slavery and gained a national reputation. In the Republican national convention



ABRAHAM LINCOLN, SIXTEENTH PRESIDENT OF THE UNITED STATES
From a favorite photograph taken by Brady in 1864.

held at Chicago in May, 1860, he was nominated as a candidate for the presidency, and after several ballots he gained a majority, and was eventually chosen unanimously. In the election of the following November he gained a majority over his several opponents and was elected President of the United States. The Southern States, exasperated at the defeat of their candidates, and alarmed at the aggressive antislavery policy which many of the leading Republicans had proclaimed their determination to follow, refused to acquiesce in Lincoln's election, and began one after another to announce their secession, and to organize the means of resisting the enforcement of the authority of the central government. Between the election of Lincoln in November, 1860, and his assumption of office on March 4, 1861, the secession movement made a rapid growth. Lincoln's intention was to use every means of conciliation consistent with the policy he deemed it essential to the national interest to pursue, but on one point his resolution was steadfast, to maintain the union of the States. Before his assumption of office the secession leaders were as resolutely determined on the other side. On the 4th of February the Southern Confederacy had been constituted, and on the 13th of April the first blow in the Civil war was struck by the capture of Fort Sumter, in Charleston harbor, by the Confederates. The events of the Civil war during the next four years in Lincoln's career belong to the history of the United States. Lincoln's persistence in raising and pouring in fresh troops after every disaster finally enabled the Federal government to subdue the secession. The toleration of slavery was always in Lincoln's opinion an unhappy necessity and when the Southern States had by their rebellion forfeited all claim to the protection of their peculiar institution, it w s an easy transition from this view to its withdrawal. The successive stages by which this was effected—the emancipation of the slaves of rebels, and the offer of compensation for voluntary emancipation, followed by the constitutional amendment and unconditional emancipation without compensation—were only the natural steps by which a change involving consequences of such vast extent was reached. The determination of the Northern States to pursue the war to its conclusion on the original issue led to the reëlection of Lincoln as president in 1864. The decisive victory of Grant over Lee on April 2, 1865, speedily followed by the surrender of the latter, had just afforded the prospect of an immediate termination of this long struggle, when, on the 14th of the same month, President Lincoln was shot in Ford's Theater, Washington, by an assassin named John Wilkes Booth, and expired on the following day. In American regard and admiration Abraham Lincoln holds a place second only to Washington.

Lincoln, Benjamin, soldier, born at Hingham, Massachusetts, in 1733; died in 1810. He joined the patriot army in the Revolution, and in 1776 was made a major-general of militia. In 1777 he was sent to reinforce General Gates in the operations against Burgoyne and here received a wound which disabled him for a year. He was given the chief command of the Southern department in 1778, and defended Charleston against General Prevost in the spring of 1779. In October he, with Count D'Estaing, made an attack on Savannah, which proved unsuccessful. He was subsequently besieged by Sir Henry Clinton in Charleston, and forced to surrender in 1780, though with no imputation on his courage and ability. He was exchanged in 1781, commanded a division at Yorktown, and was deputed by Washington to receive the submission of Cornwallis and his army as a reparation for his capture at Charleston. He was chosen Secretary of War in 1781, was elected lieutenant-governor of Massachusetts in 1787, and in 1789 and 1793 was commissioned to treat with the Indian tribes.

Lincoln's Inn. See *Inns of Court.*

Lind, Jenny (Madame Otto Goldschmid), singer, born in Stockholm in 1821; died in 1887. She received part of her musical training under Garcia at Paris; achieved her first success in Berlin in 1845, and subsequently was received with a great ovation in her native city of Stockholm. She made her first appearance in London at Covent Garden in 1847 before an enthusiastic audience; came to the United States, under the management of P. T. Barnum, and was received with extraordinary enthusiasm. Here she married Herr Goldschmid in 1851, and subsequently returned to Europe and made an extensive tour, finally settling in England. In her later life she seldom came before the public, but as professor in the Royal Academy of Music, and as trainer of the female voices in the Bach choir conducted by her husband, her talents were not lost.

Linden (lín'den), a handsome forest tree. See *Lime.*

Lindisfarne. See *Holy Island.*

Lindley (lind'li), John, botanist, born at Catton, Norfolkshire,

in 1799; died in 1865. His father was the owner of a nursery garden, and he received his education at the grammar school of Norwich. He began at an early age to write on botanical subjects; received the appointment of assistant secretary to the Horticultural Society in 1822, and became professor of botany in London University in 1829. He was editor of the *Gardener's Chronicle* from 1841 until his death.

Lindsay (lin'zē), a city in the province of Ontario, Canada, on the Grand Trunk Railway, 70 miles N. E. of Toronto. It has an extensive trade in lumber and grain and various manufactures. Pop. 1911) 6964.

Lindsay, or LYNDSAY (lind'zā), SIR DAVID, an ancient Scottish poet, usually described as 'of the Mount,' an estate near Cupar, in Fife, was born about the year 1490; died in 1555. He studied in the University of St. Andrews, and in 1509 became page of honor to James V, then an infant. In 1528 he produced his *Dreme*, and in the following year presented his *Complaynt to the King*. In 1530 he was inaugurated lyon king-at-arms, and knighted, and in 1531 sent on a mission to Charles V, on his return from which he married. He soon afterwards published a drama entitled a *Satyre of the Three Estatis*, followed in 1536 by his *Answer to the King's Flyting;* and by the *History and Testament of Squire Meldrum*, in 1538. His last work, *The Monarchie*, was finished in 1553. For more than two centuries Lindsay was the most popular poet in Scotland. His satirical attacks on the clergy in some degree paved the way for the Reformation.

Lindsey (lind'zē), BENJAMIN BARR, reformer and judge, born at Jackson, Tennessee, in 1869; studied law and was admitted to the bar in 1894. He removed to Denver, Colorado, and since 1901 has been judge of the County Court and the Juvenile Court. He took a warm interest in the condition of youthful delinquents, endeavored to improve the method of confining them, and won an international reputation as the originator of improved and humanitarian methods of dealing with the criminal and law-defying young. He is the author of the Colorado Juvenile Court Law, and established a system of putting delinquents of this class upon their honor and sentencing them to the Industrial School at Golden, Colorado. Out of the hundreds thus dealt with only five broke their trust. He succeeded in having a contributory delinquency law passed, holding parents, employers, etc., accountable for neglect. He was candidate for governor of Colorado in 1906. He wrote *Problems of the Children, The Beast and the Jungle* and *The Rule of Plutocracy in Colorado.*

Line (līn), in military language, the infantry of an army as distinguished from cavalry, artillery, militia, volunteer corps, etc., but in some cases it is also applied to the ordinary cavalry regiments. *A ship of the line*, in naval nomenclature, is a ship of war large enough to have a place in the line of battle, and was formerly a ship with not less than two decks or two tiers of guns.

Linen (lin'en), cloth made of flax, had a very ancient origin and extensive use. On the early monuments of Egypt artistic representations of the various processes of linen manufacture have been found, and the fine linen fabric in which the Egyptians wrapped their embalmed dead still gives evidence of the skill which they possessed. The Jews took with them into Canaan a knowledge of the manufacture; Tyre, Sidon and Carthage seem also to have acquired the industry; while at an early period the manufacture of linen appears to have been common in Greece and Rome. In the middle ages linen and woolen were the chief articles of dress in all European countries, and among the Flemings in particular the flax manufacture rose to great importance. The linen manufacture was known in England, Ireland and Scotland from an early period. As early as the seventh century the Anglo-Saxon women were skilled in the weaving of this fabric, and fine linen was made in Wilts and Sussex in the thirteenth century. Since the extensive introduction of cotton, however, the linen industry has decreased in relative importance. The chief center of the manufacture in England is Leeds and neighborhood. In Ireland the manufacture of linen was well established in the seventeenth century; subsequently it declined; but lately it has again obtained a flourishing position, Belfast being the center of the manufacture. Dundee is the chief center in Scotland for linen (especially coarse fabrics) as well as the allied jute manufacture. Dunfermline is celebrated for its table linens. For the Continent, France, Belgium and Germany are the chief centers of linen manufacture. Little has been done in linen weaving in the United States, though some recent progress is being made. The machinery used both in spinning and weaving linen is in general, with the exception of some special adaptations, the same as that used for cotton. (See *Cotton Spinning* and *Weaving*, also *Flax*.) The chief varieties of linen now manufactured are: lawn, which is of fine qual-

ity and mostly produced in Ireland; plain cloths for skirtings, bedding, etc.; damasks, tablecloths, and other ornamental fabrics; and cambric, which is the finest of all linen fabrics.

Line of Beauty, a term used by some artists for an ideal line, frequently represented in the form of a very slender elongated letter S.

Ling (*Lota molva*), a species of sea-fish allied to the cod family (Gadidæ), and measuring from 3 to 4 feet in length. It abounds around the British

Ling (*Lota molva*).

coasts, and is caught with hook and line, and preserved in immense quantities in a dried state. From the beginning of February to May the ling is in highest perfection; the spawning season commencing in June.

Lingam (lin'gam), among the Hindus, the emblem of the male generative power of nature. It is worshiped either alone or in conjunction with the *yoni* or female generative power.

Lingard (lin'gârd), John, an English historian, born at Winchester in 1771; died at Hornby in 1851. He was educated at the English College, Douai; established a new college at Crook Hall, near Durham, himself being vice-president, in 1794; became a priest in 1800 at Newcastle-on-Tyne; opened Ushaw Roman Catholic College in 1808, and in 1811 retired as priest to Hornby in Lancashire, where he died. He was offered a cardinal's hat by Leo XII; in 1839 he accepted a pension of £300 from the queen. His *Antiquities of the Anglo-Saxon Church* appeared in 1808, and his great work on *The History of England from the Invasion of the Romans to the year 1688* was first printed in 1819-25, and reached a fifth edition in 1850. Lingard's *History* is considered a standard work from the Roman Catholic standpoint.

Linguaglossa (lēn'gwa-glos-sa), a town of Sicily, on the northeast slope of Etna. Pop. 13,121.

Lingula (ling'gū-la), a genus of molluscs of the class Brachiopoda and family Lingulidæ, a family that has survived with but little change since the early Silurian period. These molluscs are one of the few examples of pedunculated bivalve shells. The members of the genus inhabit the Indian Archipelago and the Australasian seas.

Liniment (lin'i-ment), in medicine, a species of soft ointment of a consistence somewhat thinner than an unguent, but thicker than oil. The term is also applied to spirituous and other stimulating applications for external use.

Link, in land-measuring, a division of Gunter's chain, having a length of 7.92 inches. The chain is divided into 100 links, and is 66 feet in length. 100,000 square links constitute an imperial acre.

Linköping (lin-cheup'ing), a town of Sweden, capital of the län of East Gottland, in a fertile district on the Stang, near Lake Roxen. The town has a handsome cathedral, a library rich in rare editions of the Bible, episcopal castle, etc. Pop. 14,552.

Linlithgow (lin-lith'gō), a borough of Scotland, capital of Linlithgowshire, 17 miles west of Edinburgh, in a hollow along the southern bank of Linlithgow Loch. It consists principally of one irregular street, about one mile long, lying east and west. The principal buildings of interest are the palace, now a ruin, where James V and Mary Queen of Scots were born; and the church of St. Michael, an ancient Gothic edifice. It was in the High street of Linlithgow that Hamilton of Bothwellhaugh assassinated the Regent Murray in 1570. Pop. 4279.—The County of Linlithgow, or West Lothian, is bounded by the Firth of Forth, Edinburghshire, Stirling and Lanark; area, 120 square miles. This county is one of the richest in Scotland in minerals, including coal, shales, ironstone, freestone, limestone. The soils are generally strong and well drained, but in the southwest parts of the county there is a considerable extent of thin, boggy ground. The principal manufacture is that of paraffin-oil, which is carried on at Bathgate, Uphall, and other places. Principal rivers, Almond and Avon. Principal towns, Linlithgow, Bathgate, Borrowstounness and Queensferry. Pop. 65,708.

Linnæa (lin-nē'a), a genus of plants of the nat. order Caprifoliaceæ (honeysuckles). It contains but one species (*L. borealis*), a creeping evergreen plant found in woods and in mountainous places in Scotland and other northern countries, including North America as far south as Maryland, bearing two beautiful drooping fragrant bell-shaped pink flowers on each flower-stalk. The plant was an especial favorite with

Linnæus, and was named in honor of him by Gronovius.

Linnæan Society, a society instituted in London in 1788 by Dr. J. E. Smith, and incorporated in 1802, for the promotion of the study of all departments of botany and zoölogy. It has an excellent library, a museum, and herbarium, the nucleus of which were formed by the collections of Linnæns himself. Fellows take the initials F. L. S.

Linnæus. See next article.

Linné (lin'nā), KARL VON, commonly called LINNÆUS, the greatest botanist of his age, was born at Rashult, Sweden, in 1707, and died at Upsala in 1778. He was the son of a clergyman, who had him educated at the grammar school and the gymnasium of Wexiö. He showed an early interest in botany; entered the University of Lund, where his botanical tastes were encouraged; and removed to Upsala in 1728, where he undertook tho supervision of the botanic garden. Here he made the acquaintance of the botanist Rudbeck, whose assistant he became. Aided by the Academy of Sciences at Upsala, Linne made a journey through Lapland, the result of which was shown in his *Flora Lapponica*, published 1735. In this year he went to the University of Harderwyk, in Holland, and took an M.D. degree; afterwards visited Leyden, where he published the first sketch of his *Systema Naturæ* and *Fundamenta Botanica*. In 1736 he visited England, went to Paris in 1738, and afterwards settled in Stockholm as a physician. He became professor of medicine at Upsala in 1741, and then of botany and natural history; was made a knight of the Polar Star with the rank of nobility; and died on his estate near Upsala from apoplexy. The great merit of Linné as a botanist was that he arranged plants on a simple system of sexual relationship and prepared the way for the more natural and satisfactory classification which has superseded the Linnæan system. The system of naming genera and species devised by him is still in common use. Nor must it be forgotten that he was eminent not only in botany, but in all the sciences of his time. His chief works besides those already mentioned were: *Genera Plantarum* 1737, *Classes Plantarum* (1738), *Flora Succica* (1745), *Fauna Succica* (1746), *Philosophia Botanica* (1751), and the *Species Plantarum* (1753).

Linnell (lin'el), JOHN, artist, born at London in 1792; died in 1882. He was a student at the Royal Academy; a pupil of Benjamin West and the friend of William Blake, whose portrait he painted. His earlier reputation is associated with portraiture, but in his later period his fame became identified with landscape, and more especially the scenery of Surrey. His sons, JAMES THOMAS LINNELL and WILLIAM LINNELL, are also well-known artists.

Linnet (lin'et), a small singing bird of the finch family, *Fringilla linōta* or *cannabīna*. Its general plumage is brownish, the top of the head and breast being reddish in the breeding season. It is one of the commonest of British birds, everywhere frequenting open heaths and commons, and breeding in the furze and other bushes. They are cheerful and lively birds, and very sweet and pleasing songsters. Called also provincially *Lintie* and *Lintwhite*.

Linoleum (li-nō'le-um), a preparation of linseed-oil with chloride of sulphur, by which it is rendered solid and useful in many ways. When rolled into sheets it is used as a substitute for india-rubber or gutta-percha; dissolved it is used as a varnish for waterproof textile fabrics, table-covers, felt carpets, and the like; as a paint it is useful both for iron and wood, and for ships' bottoms; as a cement it possesses some of the qualities of glue; vulcanized or rendered hard by heat it may be carved and polished like wood for mouldings, knife-handles, etc.; and mixed with ground cork and pressed upon canvas it forms floor-cloth.

Linotype (lī'nō-tīp), a recently invented printing machine, in which types are discarded, and matrices used instead, these being brought to the proper places by touching corresponding keys on a keyboard similar to that of a typewriter, the rows of matrices being then automatically filled with molten metal so as to produce solid bars or lines of type, and then automatically returned to their places. It has very largely superseded the hand-setting of type, enabled the voluminous newspapers of to-day to be issued and considerably cheapened the price of books.

Linseed-oil (lin'sēd), the oil got from the seeds of flax either by pressure in the cold or by heating to about 200° Fahr. It is of a pale to dark yellow color; may or may not have a smell; has specific gravity from 0.928 to 0.94; and remains liquid even at zero Fahr. Linseed-oil is largely used in the arts, for painting, for printer's-ink, etc.; and in medicine, especially for burns. *Linseed-cake* is the solid mass or cake which remains when oil is expressed

LION AND LIONESS

The lion inhabits Africa and certain parts of Asia. The lioness is much smaller than the lion, and does not have the magnificent mane which is so great an ornament to her mate. Often she is fiercer and more active than the male.

from flaxseed. It is much used as food for cattle and sheep, and is called also *Oil-cake.*

Linstock (lin'stok), a pointed staff with a crotch or fork at one end to hold a lighted match, formerly used in firing cannon.

Lint, in surgery, is the scrapings of fine linen, used by surgeons in dressing wounds. Lint made up in oval or orbicular form is called a *pledget;* if in a cylindrical form, or in shape of a date or olive stone, it is called a *dossil.*

Lintel (lin'tel), in architecture, a horizontal piece of timber or stone over a door, window, or other opening, to discharge the superincumbent weight.

Linton, a city in Greene county, Indiana, 53 miles N. E. of Vincennes. It is in a farming section, with coal mines in its vicinity. Pop. 5906.

Linum (lī'num), the flax genus of plants, which gives its name to the nat. order Linaceæ. There are about eighty species, herbs or rarely small shrubs, chiefly found in the temperate and warmer extra-tropical regions of both hemispheres. Few are of any importance, except the flax plant (*L. usitatissimum*).

Linz (lints), the capital of Upper Austria, situated on the right bank of the Danube, 117 miles W. of Vienna. It is defended by a circle of detached forts extending over a circuit of 9 miles. It has an old cathedral, a new cathedral, provincial parliament house, castle, town house, bishop's palace, etc. The manufactures consist chiefly of woolen, linen, silk and cotton goods, machinery, hardware, etc. There is an extensive trade on the Danube. Pop. 58,778.

Lion (lī'un; *Felis leo*), a quadruped of the cat genus, the most majestic of all carnivorous animals, distinguished by its tawny or yellow color, a full flowing mane in the male, and a tufted tail with a sort of sharp nail at the end of it. The largest lions are from 8 to 9 feet in length. The period of gestation is five months; one brood is produced annually, with from two to four at a birth, and the mother nourishes the whelps for about a year. The mane of the male lion begins to grow when it is

Head of Gambian Lion (*Felis Leo gambianus*).

Head of Maneless Lion (*Felis Leo goojratensis*).

three years old; the adult age is reached about six or seven; and the extreme age is about twenty-two, although authorities differ from this estimate. The lion is a native of Africa and parts of Western and Central Asia. It preys chiefly in the night and on live animals, avoiding carrion, unless impelled by intense hunger. It approaches his prey with a stealthy pace, crouching when at a proper distance, when it springs upon it with fearful velocity and force. The whole frame is extremely muscular, the forepparts being particularly so, giving with the large head, flashing eye and copious mane, a noble appearance to the animal, which has led to its being called the 'king of beasts,' and to fancies of its noble and generous nature which have no real foundation. Of the African lion there are several varieties, as the Barbary lion, Gambian lion, Cape lion. The Asiatic varieties are generally smaller and may want the mane, as the maneless lion of Gujerat.

Lipari Islands (lip'a-rē, or lē'pa-rē), a cluster of volcanic islands in the Mediterranean, which take their name from the principal one of the group, about 24 miles from the N. coast of Sicily. Lipari, the largest, is well cultivated, producing figs, grapes and raisins, sulphur, etc. It is about 15 miles in circumference, and has a population of 13,000. On the eastern coast is situated a town of the same name, containing a cathedral; pop. 5000. The other islands are Stromboli, Panaria, Vulcano, Salina, Alicudi and Filicudi, with two or three smaller ones. Stromboli is mainly composed of an incessantly active volcano. Pop. of the group, 20,224.

Lipetzk (lye'petsk), a town of Russia, in the government of Tambov, on the Voronej, on two elevations, the cathedral being on one. It has much-frequented mineral springs. Pop. 16,353.

Lippe (lip'pė), or incorrectly LIPPE-DETMOLD, a principality of north Germany, bounded chiefly by Rhenish Prussia and Hanover; area, 469 square miles. It lies on the Teutoburger Wald, and drains into the Weser, the Ems and the Rhine. Over half of the surface is arable, more than a fourth under wood. There are some valuable saline springs. The principal towns are Detmold, Lemgo and Horn. Lippe is a member of the German Empire, and sends one member to the Bundesrath and one to the Reichstag. A very large majority of the inhabitants are Protestants. Pop. 138,952.

Lippi, FRA FILIPPO, an Italian painter, born in Florence about 1412; died at Spoleto in 1469. He was placed in a monastery at Florence, where he studied and showed a great capacity for drawing, and where he painted, it is said, a fresco in one of the cloisters. He left the monastery about 1432, was for some time a slave in Barbary, on being set at liberty returned to Italy and painted at Florence, Prato, and, finally, Spoleto. His most famous paintings are a *Coronation of the Virgin*, Florence; frescoes on the stories of St. Stephen and John the Baptist in the Duomo of Prato; and a *Vision of St. Bernard*, in the National Gallery, London.—FILIPINO LIPPI, an Italian painter, and the reputed son of the former, was born at Florence about 1457, and died there 1504. Most of his paintings are to be seen in Florence.

Lippia (lēp'i-a), a genus of plants, nat. order Verbenaceæ. *L. pseudo-thea*, a native of Brazil, is aromatic and fragrant, and when dried makes an agreeable tea.

Lippincott (lip'in-kot), SARAH J., author, born at Pompey, New York, about 1825; died in 1904. She wrote under the pen name of 'Grace Greenwood,' among her works being *Greenwood Leaves*, *Forest Tragedy*, *Records of Five Years*, *New Life in New Lands*, etc. Marrying Leander K. Lippincott, of Philadelphia, in 1853, she became editor of a juvenile periodical called *The Little Pilgrim*.

Lippstadt (lip'stat), a town of Westphalia, Prussia, in the government of Arnsberg, 24 miles N. N. E. of the city of that name, on the Lippe. Pop. (1905) 15,436.

Lipsius (lip'sī-us), JUSTUS, properly JOEST LIPS, a Flemish scholar, born in 1547; died in 1606. He was educated at Brussels, and subsequently at Cologne and Louvain; held positions at Rome, Jena, Cologne and Louvain; changed from Catholicism to Protestantism and back again; and finally died at Louvain as professor of ancient history. His works were numerous, and he rendered important services to the study of the Latin authors, especially Tacitus, Seneca, Plautus, etc.

Liquation (lī-kwā'shun), or ELIQUATION, the process of separating by a regulated heat an easily fusible metal from an alloy in which is a metal difficult of fusion. Thus in the refining of tin to remove slag, iron, copper and other metals, the ingots are heated in a reverberatory furnace to a temperature just sufficient to melt the tin, while the impurities are left behind on the hearth.

Liqueur (li-k*eur*'; the French name), a palatable spirituous drink composed of water, alcohol, sugar, and an aromatic infusion extracted from fruits, seeds, etc. The best-known liqueurs are absinthe, anisette, chartreuse, curaçoa, maraschino, kümmel and noyau.

Liquid Air (lik'wid) is produced by the cooling that air undergoes when compressed air expands and passes from a given to a lower pressure. To obtain a liquefaction of the air at atmospheric pressure it is necessary to cool it to —191°; that is, to compress it to 800 atmospheres before expanding it. This is accomplished by an electric motor actuating a pump which sucks air from the atmosphere. It is then dried by passing over chloride of calcium, thence into a liquid ammonia refrigerating apparatus where it is cooled and liquified by expansion. Liquid air is successfully employed in the production of oxygen. It is of little use as a motive power or refrigerant, partly on account of its cost.

Liquidation (li-kwi-dā'shun) indicates the winding up of any business, more especially a joint-stock company. It may apply to insolvent firms that voluntarily wish to close up their business.

Liquorice (lik'u-ris), a name for herbs of the genus *Glycyrrhiza*, belonging to the nat. order Leguminosæ, and growing in S. Europe, Asia and Africa. *G. glabra* is a perennial plant with herbaceous stalks and bluish papilionaceous flowers. The well-known liquorice juice, used as a demulcent and expectorant, is extracted from the root as well as from that of others. *Indian*

liquorice is *Abrus precatorius.* See *Abrus.*

Lira (lē′ra; from the Latin *libra*, pound) is the name given to an Italian silver coin of the value of about 19 cents. It corresponds to the French franc, and is equal to 100 centesimi.

Liria (lē′re-ä), a town of Spain, in the province and 17 miles northwest by west of Valencia, on the left bank of the Guadalquivir. Pop. 8839.

Liriodendron (lir-i-ō-den′dron), a genus of North American trees belonging to the nat. order Magnoliaceæ, and containing only one species, the tulip-tree (L. *tulipifĕra*). See *Tulip tree.*

Lisbon (liz′bun; Portuguese, *Lisboa*), the capital and principal seaport of Tagus, about 9 miles above its mouth. It is built on and at the foot of a succession of hills, in the form of an amphitheater, and the churches, convents and houses, of a dazzling whiteness, have an imposing effect when viewed from the river. The streets of the older parts in general are steep, narrow, crooked, badly paved and filthy; but the more modern parts of the town are regular and well built. The chief open space is the Praça do Commercio, a large and handsome square, surrounded by public buildings. The western quarter of the city, called Buenos Ayres, is airy and pleasant, and chiefly occupied by foreigners. The town of Belem, still farther to the west, forms a sort of suburb to Lisbon. Above it stands the royal palace of Ajuda, a conspicuous edifice of white marble. Among the chief buildings are the castle of St. George or citadel, the cathedral, the church do Coraçao de Jesus, the custom-house and other government buildings on the Praça do Commercio, the town hall, etc. But the most remarkable specimen of architecture of which Lisbon can boast is the aqueduct which conveys water to the city from springs about 10½ miles distant. The scientific and literary institutions comprise the Royal Academy of Sciences, Polytechnic School, National Museum and Picture Gallery, and National Library, containing about 200,000 volumes. The harbor is one of the finest in the world, and the quays extend between 2 and 3 miles along the bank of the river. The exports consist chiefly of wine, oil and fruit; and the principal imports are cotton, cotton tissues, sugar, grain, coal, tobacco, coffee, etc. The manufactures are tobacco, cotton, wool, silk, paper, chemicals, soap, etc. Lisbon is a place of remote antiquity, its earliest name being *Olisipo.* In 1755 it was visited by an earthquake, which threw down a considerable portion of the city, and destroyed above 30,000 of its inhabitants. It was taken by the French in 1807, but resisted an attack by Masséna in 1809. It was the center of the revolution of 1910, by which Portugal was converted from a monarchy into a republic. Pop. 356,009.

Lisburn (lis′burn), a town of Ireland, in the Counties of Antrim and Down, 8 miles southwest from Belfast. It has a cathedral church of the united dioceses of Down, Connor and Dromore, which contains a monument to Jeremy Taylor, who died here in 1667. Flax spinning and weaving, and the manufacture of thread and muslin, employ the greater number of the inhabitants. Pop. 11,460.

Lisieux (liz-*yeu*), a town of France, department of Calvados, on the Touques, 27 miles E. S. E. of Caen. Its principal edifices are a fine Gothic cathedral of the twelfth century, and an episcopal palace. The manufactures consist of muslin, broadcloth, flannel, etc. Pop. (1906) 15,194.

Liskeard (lis-kärd′), a municipal borough of England, county of Cornwall, 18 miles northwest of Plymouth. There are tin, lead and copper mines in the vicinity. Pop. 4371.

Lismore (liz-mor′), an island of Scotland, off the west coast of Argyle, and forming part of that county, at the entrance of Loch Linnhe; area, 15

square miles. In ancient times Lismore was the residence of the bishops of Argyle and the Isles, and the remains of their palace are still seen.

Lissa (lis'sȧ), an island belonging to Austria, in the Adriatic, off the coast of Dalmatia; length, 10 miles; breadth, 5 miles. From 1810 to 1815 it was held by the British, who built some fortifications and defeated all the attempts of the French to dislodge them. Pop. 9918. The town of Lissa, or San Giorgio, on a bay on the northeastern side of the island, was attacked by the Italian fleet on August 18 and 19, 1866, and on the 20th an engagement took place between the Italian and Austrian fleets, in which the Italians were defeated. Pop. 9918.

Lissa, a town of Prussia, province of and 44 miles s. s. w. of Posen. It has a castle and manufactures woolens, leather and tobacco. Pop. (1906) 16,021.

Lister (lis'tėr), Joseph, Lord, an English surgeon, was born at Upton, Essex, in 1827. From 1860 to 1869 he was professor of surgery in Glasgow University; from 1869 to 1877 professor of clinical surgery in the University of Edinburgh; subsequently in King's College, London. His name is more especially connected with the successful application of the antiseptic treatment in surgery, which inaugurated a new era in this branch of medical science. He received in consequence numerous honors, was made a baronet in 1883 and a peer in 1897. He published various papers on *Surgical Pathology*, etc. He died February 11, 1912.

Liston (lis'tun), John, comedian, the son of a London watchmaker, born in 1776; died in 1846. He made his first appearance at the Haymarket in 1806, transferring his services to Drury Lane in 1823, and attaching himself to Madame Vestris' company at the Olympic from 1831 to 1837. Among his most famous characters were *Mawworm* in the *Hypocrite* and *Paul Pry*.

Liston, Robert, a Scottish surgeon, born in 1794; died in 1847. He studied at Edinburgh College, became one of the house surgeons at the Royal Infirmary there in 1815; delivered lectures on anatomy and surgery, and in 1833 published his *Principles of Surgery*. The following year he removed to London as surgeon to the North London Hospital, and became professor of clinical surgery in University College, an office which he retained till his death. He was one of the most eminent surgeons of his time.

Liszt (list), Abbé Franz, distinguished pianist and composer, was born in Hungary in 1811, and died in 1886. He made his first public appearance in his ninth year; studied in Vienna and Paris; produced an opera in 1825, and became director of the Court Theater at Weimar in 1849. This gave him the opportunity to introduce the music of Wagner, Berlioz, Schumann, and the writers of what is known as 'the music of the future.' In 1861 he took up his residence in Rome, where he joined the priesthood. In 1870 he became director of the Conservatory of Music at Pest. His chief works are the *Faust* and *Dante* symphonies, and the oratorios *St. Elizabeth* and *Christus*.

Litany (lit'a-ni; from the Greek *litaneia*, supplication), a term generally applied to a series of short prayers or supplications together forming one whole. The term was used by the early church to denote any form of prayer, and it was not until the fifth century that litanies came specifically into use. Litanies became afterwards very common, and every saint of the Roman calendar had his litany. The best-known litany at the present day is that of the Anglican Church.

Litchfield. See *Lichfield*.

Litchfield (lich'fēld), a city of Montgomery county, Illinois, 45 miles s. of Springfield. It has coaling and oil industries, and manufactures of wind-mills, tanks, mine engines, flour, bottles, etc. Pop. 5971.

Litchi, or Lee-Chee (*Dimocarpus* or *Nephelium Litchi*), the fruit of a tree belonging to the natural order Sapindaceæ, a native of the south of China. The tree is of a moderate size, with brown bark, the leaves large, and the fruit is produced in bunches, which are pendant from the extremities of the twigs. The litchi is a red or green berry, about 1½ or 2 inches in diameter, with a tough, thin, leathery coat, and a colorless half-transparent pulp, in the center of which is a single brown seed. The pulp is slightly sweet, and grateful to the taste.

Lit de Justice (lē dė jŭs-tēs; literally 'bed of justice'), was formerly a solemn proceeding in France, in which the king, with the princes of the blood royal, the peers, and the officers of the crown, state, and court, proceeded to the parliament, and there, sitting upon the throne (which in the old French language was called *lit*), caused those commands and orders which the parliament did not approve to be registered in his presence. The last lits de justice were held by Louis XVI in 1787 and 1788.

Literary Property. See *Copyright.*

Litharge (lith'arj), the yellow or reddish protoxide of lead partially fused (PbO). It is extensively used in the manufacture of glass, of enamels, of artificial gems, of lead plaster and lead soap, of sugar of lead, white and red lead, and other compounds. See *Lead.*

Lithia (lith'i-a; Li_2O), the only known oxide of the metal lithium, which was at first found in a mineral called petalite. It is of a white color, very soluble in water, acrid, caustic, and acts on colors like other alkalies.

Lithic Acid. See *Uric Acid.*

Lithium (lith'i-um), symbol Li, atomic weight 7, the metallic base of lithia, which base was obtained by Sir H. Davy in the electrolysis of fused lithium chloride. It is of a silver-white luster but quickly tarnishes in the air. Lithium may be cut with a knife, but it is scarcely so soft as potassium or sodium; it fuses at 180° C., and takes fire at a somewhat higher temperature. Lithium floats upon rock oil; it is the lightest of all known solid bodies; sp. gr. 0.5936. It forms salts analogous to those of potassium and sodium. Compounds of lithium are used in pyrotechny on account of the splendid red color they impart to flame. In medicine the carbonate is employed especially as a solvent for uric acid, to prevent the formation of calculi and to remove it from the system in gout. Effervescing lithia water is sometimes used in place of soda or potash water. Citrate of lithia is also employed. Its therapeutic properties are similar to those of the carbonate.

Lithography (lī-thog'ra-fi), the art of drawing upon and printing from stone. The facility with which this is accomplished arises from the antagonistic qualities of grease and water. The processes of the art depend on the adhesion to a grained or polished stone of a certain greasy composition which forms the lines of the drawing, etc.; on the power acquired by those parts penetrated by the greasy composition of attracting and becoming covered with a specially prepared ink; on the interposition of water, which prevents the ink adhering to the parts not impregnated with the grease; and on pressure, which transfers to paper the greasy tracings or drawings. It is the invention of Alois Senefelder, a native of Prague (1771-1834). At first the progress of the art was slow; but latterly its developments have been rapid, so that Germany, France and Great Britain vie with each other in the artistic beauty of their lithographic productions. The materials, instruments and methods of this art are as follows:—

The *lithographic stones*, first used by Senefelder, have proved to be the most suitable for the purposes of lithography. This stone, which is found in the district of Kellheim, Bavaria, is a species of slaty limestone; its color in the best quality is pale-yellowish drab, and for printing purposes its thickness must be from 1½ to 4 inches. In preparing stones for the printer they are squared, leveled, ground and polished.

Lithographic *ink* is made of wax, white soap, tallow, shellac, mastic and lamp-black. What are called *chalks* are made from much the same materials; these ingredients being subjected to heat until they are fused, poured out on a slab to cool, and then cut into the required sizes.

There are various styles in which drawings on the stone are executed. *Drawing on the smooth stone* is executed with steel pens and sable-hair brushes. The design, etc., is drawn on the stone in reverse, after which it is slightly etched with dilute acid. In *chalk drawing* the surface of the stone is roughed or grained, after which the drawing is traced upon the stone. The tinting or shading follows. When completed the drawing is etched, after which it is put into the hands of the printer for printing. In *engraving on stone* the stone is first prepared with a solution of acid and gum. It is then washed with water, and a dry red or black powder rubbed over it. The drawing is produced by lines scratched through this ground into the stone. These lines are then spread with linseed-oil, and afterwards *charged* with printing ink, from which impressions are taken. *Etching on stone* is in most respects similar to etching on copper. The stone is prepared in the same manner, the biting-in is effected with dilute acetic acid, and the lines filled in with printing ink. The method of drawing directly on the stone has been largely superseded by the use of prepared paper, both grained and smooth, on which the drawing is executed, and afterwards transferred to the stone. *Tinting and chromo-lithography* is much practiced in the reproduction of works of an artistic character. See *Color-printing* and also *Photo-Lithography*, under *Photography.*

In the year 1850 steam-power began to supersede manual labor in driving the lithographic press, and afterwards a cylinder machine was introduced, which from time to time has been greatly improved.

This machine, running at 500 revolutions in the hour, can produce good work, but for printing fine chalk drawings of large size the hand-press is still preferred. The number of good impressions that can be taken from one drawing or transfer ranges from 500 to 5000; chalk drawings producing few and ink drawings many copies. The drawing or writing can also be preserved good on the stone for any length of time by rolling it with a special kind of ink and covering it with gum mixed with sugar-candy. For similar purposes zinc has been treated in much the same manner as stone. See *Zincography.*

Lithophagi (li-thof'a-gi), or LITHOPHAGIDÆ, a name applied to species of bivalve and univalve mollusca, etc., that penetrate stones and masses of corals.

Lithospermum. See *Gromwell.*

Lithotomy (lith-ot'o-mi), in surgery, the technical name for the operation popularly called cutting for the stone. As usually performed it consists in cutting through the perineum in front and to the left of the anus, so as to reach and divide the urethra and neck of the bladder where it is surrounded by the prostate gland. A grooved and curved staff is introduced into the bladder first, and then the incision is made in the perineum to reach the bladder, the groove in the staff serving as a guide to the knife. When thus performed, the operation requires seldom more than three minutes, and in favorable cases the wound heals in the course of a month.

Lithotrity (lith-ot'ri-ti), in surgery, the operation of crushing a stone in the bladder into fragments of such a size that they may be expelled by the urethra. The instrument by which the stone is broken up is introduced in the same manner as a catheter or sound into the bladder, and after catching the stone either crushes, bores, or hammers it to pieces. The instrument, which is called a lithotrite, has two movable blades at the extremity, which are brought together to crush the stone by means of a powerf l screw.

Lithuania (lith-u-ā'ni-a), a region in Eastern Europe which formed a grand-duchy in the eleventh century; became united to Poland in the fourteenth century; and at the dismemberment of that kingdom, in 1773-95, was nearly all appropriated by Russia, now forming the governments of Mohilev, Vitepsk, Minsk, Vilna and Grodno; area about 100,000 square miles, of which 6700 are in Prussia. The Lithuanians are a race of people closely akin to the Letts. They are fair-haired, blue-eyed and light-skinned; of mild disposition, and chiefly occupied in agriculture. Their language is akin to the Lettic and Old Prussian, and forms with these the Lithuanian or Lettic branch of the Aryan family of tongues. Their literature consists chiefly of popular songs and hymns, religious works, tales, etc.

Litmus (lit'mus), or LACMUS, a peculiar coloring matter procured from *Roccella tinctoria* and some other lichens. Paper tinged blue by litmus is reddened by the feeblest acids, and hence is used as a test for the presence of acids; and litmus paper which has been reddened by an acid has its blue color restored by an alkali.

Litre (lē-tėr), LITER, the French standard measure of capacity in the decimal system. The litre is a cubic decimetre; that is, a cube, each of the sides of which is 3.937 English inches; it contains 61.028 English cubic inches; the English imperial gallon is equal to 4½ litres, or more exactly 4.54345797 litres.

Littleborough (lit'tl-bur-ō), a large and populous village of Lancashire, England, 9½ miles N. E. of Rochdale. The inhabitants are chiefly employed in cotton and woolen manufactories, fire-brick works and collieries. Pop. (1911) 11,705.

Little Christians, a sect of Russian dissenters claiming to be the possessors of a special revelation.

Little Falls, a city, capital of Morrison county, Minnesota, on the Mississippi River, 106 miles N. W. of St. Paul. It has saw, pulp and paper mills, and other industries. Pop. 6078.

Little Falls, a city of Herkimer county, New York, on the Mohawk River and Erie Canal, 21 miles from Utica. The river here passes through a narrow gorge and falls 44 feet, yielding abundant water power. It has large knitting mills, woolen and paper mills, etc., and has an important trade in cheese and other dairy products. Pop. 12,273.

Littlehampton (lit'tl-hamp-tun), a maritime town of England, county of Sussex, 18 miles west of Brighton, at the influx of the Arun into the English Channel. It has become a fashionable sea-bathing resort. Pop. (1911) 8351.

Little Rock, a city, capital of Arkansas, on the right bank of the Arkansas, here navigable, 250

miles from its mouth. It stands on a rocky bluff, rising about 50 feet above the river. It has a State house and other State and educational institutions; is an important shipping point for cotton. Its industries are cottonseed-oil, mills, shops, cooperage and railroad repair shops, and it has a cotton shipping trade. Pop. 45,941.

Littleton, or LYTTLETON (lit-tl-tun), THOMAS, a celebrated English judge, born at the beginning of the fifteenth century; died in 1481. In 1455 he went the northern circuit as judge of assize, and was in 1466 appointed by Edward IV one of the judges of the common pleas. His work on *Tenures*, with the commentary of Coke, passed through a great number of editions, and was at one time the principal authority on real property in England.

Littorina. See *Periwinkle.*

Littré (lē-trā), MAXIMILIEN PAUL EMILE, a French philologist, was born at Paris in 1801, and died there in 1881. He originally studied medicine, then took up philosophy and philology, adopted the positive philosophy of M. Comte, and published works connected with this subject, as well as works connected with medicine, including a translation of Hippocrates. In 1862 he brought out his *Histoire de la Langue Française.* His chief work, a dictionary of the French language, was begun in the following year, and completed with supplements in 1877. It is a monument of erudition and industry, and its success was prompt and complete. In 1871 he became a representative in the National Assembly, in 1875 was named senator for life, and next year was admitted a member of the French Academy.

Littrow (lit'trō), JOSEPH JOHANN VON, an Austrian astronomer, born in 1781; died in 1840. He became joint-director of the observatory of Buda, and in 1819 director of the observatory of Vienna. He published numerous books on astronomy, the best known of which are *Die Wunder des Himmels* (1834), and *Theoretische und praktische Astronomie* (1822-26).

Liturgy (lit'ur-gi), a special series of prayers, hymns, pieces of Scripture, or other devotional matter, arranged and prescribed for use in worship; or in a narrower sense a prescribed service for the celebration of the eucharist; hence in the Roman Catholic Church equivalent to the mass or service contained in the Missal. There are a number of ancient liturgies connected with various places or names of various persons, but there seems to have been no written liturgy earlier than the fifth century. The chief liturgical books in the Roman Catholic Church are the *Missal* and the *Breviary* (which see), both in Latin. In 1523 Luther drew up a liturgy, or form of prayer and administration of the sacraments, which in many points differed but little from the mass of the Church of Rome. He did not, however, confine his followers to this form, and hence every country in which Lutheranism prevails has its own liturgy. Calvin prepared no liturgy; but his followers in Geneva, Holland, France, and other places drew up forms of prayer, of which the Genevese and the French are the most important. In England before the Reformation the public service of the church was performed in Latin, and different liturgies were used in different parts of the kingdom. The most celebrated of these were the *Breviary* and *Missal secundum usum Sarum* (that is, as used at Salisbury), compiled by the Bishop of Salisbury about 1080. The English Book of Common Prayer dates from the reign of Edward VI. (See *Common Prayer.*) It was based on the Roman Breviary. In the portions of Scripture contained in the Prayer Book the authorized version was later adopted, except in the Psalms, which are according to Coverdale's Bible. The liturgy of the Episcopal Church in Scotland is the same as that of the Church of England, except that there is a different communion office, which, however, is used only in some of the Scotch churches. The Kirk of Scotland, or the Scotch Presbyterian Church, has no liturgy, the Directory for the Public Worship of God being only certain general rules for the conduct of public worship. The Book of Common Prayer of the Protestant Episcopal Church in the United States was adopted in 1789 with some minor deviations from the English.

Liutprand, or LUITPRAND (lūt'-prand), historian, prelate and diplomatist, was born at Pavia about 920, and died at Cremona about 972. From being page of King Hugo of Italy he rose to be chancellor under his successor, Berengarius. He was then patronized by the Emperor Otto of Germany and appointed Bishop of Cremona. He was employed as an ambassador on several important missions, and had in this way an excellent opportunity of studying the events of the period. Besides an interesting narrative of a mission to Constantinople, he has left us a History of Otto; and his *Antapodosis*, a history of Europe in six books, from 886 to 950. These works are the chief historical authority for that period.

Livadia (liv-a-dē'a), the name given under the Turkish rule to Northern Greece.

Livadia, or LEBADEA, a town of Greece, 52 miles northwest of Athens. It was of note in ancient times and flourished in the middle ages and under Turkish rule, but has declined. It is poorly built, and consists of narrow, ill-paved streets. Pop. 6494.

Live Oak. See *Oak.*

Liver (liv'er), the glandular structure, which secretes the bile. This gland is not confined to the Vertebrate animals, all of which—save the Amphioxus or lancelet—possess a well-developed liver, but is found in many Invertebrata. In man the liver is part of the alimentary apparatus, and is situated just below the diaphragm on the right side, extending across the middle line of the body towards the left side. Its front border reaches just below the border of the chest when the posture is sitting or standing; but when the person lies down the liver passes slightly up so as to be completely under cover of the ribs, except a small portion which extends beyond the lower end of the breast-bone. From its position it is extremely liable to compression and injury. It is the largest gland in the body, and weighs from 50 to 60 ounces avoirdupois. In its general form the liver is flat, broad and thick towards the right side, becoming narrow and thin towards the left side. Its upper surface is convex or arched and fits into the concave surface of the diaphragm while its lower surface is irregularly divided into certain 'lobes,' five in number, and separated by clefts or fissures. These lobes are known as the right, left spegelian, caudatus and quadrate lobes.

When microscopically examined the entire mass of the liver is found to consist mainly of large many-sided cells containing granular protoplasm. They are arranged in groups or masses, each little mass being called a lobule, and each lobule slightly mapped off by connective tissue and containing a meshwork of blood-vessels and ducts. These blood-vessels are branches of the *portal vein.* This vein receives the blood which has circulated in the stomach and intestines and carries it throughout the entire liver by a network of finely subdivided veins. It is from this supply of blood that the bile is secreted. The blood passes off from the liver by the *hepatic vein,* formed by the union of small vessels which begin in the center of the lobules. The connective tissue of the liver is supplied with arterial blood by the *hepatic artery.* This blood, like that which has entered through the portal vein, is drained off into the hepatic vein. There is, however, another set of vessels which ramify through the liver, namely the *bile ducts,* whose business it is to carry off the bile produced in the gland. These ducts intersect and unite until in the end two channels are formed, one from the right and the other from the left of the liver, which ultimately form one common exit into the small intestine called the *common bile duct.* Thus, when the bile has been secreted by the liver-cells, it is transferred by way of this hepatic duct into the small intestine, where it mingles with the food. When this flow of bile ceases, as it does when intestinal digestion is interrupted, the supply which still continues is stored in the gall bladder, which forms a kind of reservoir situated under the liver.

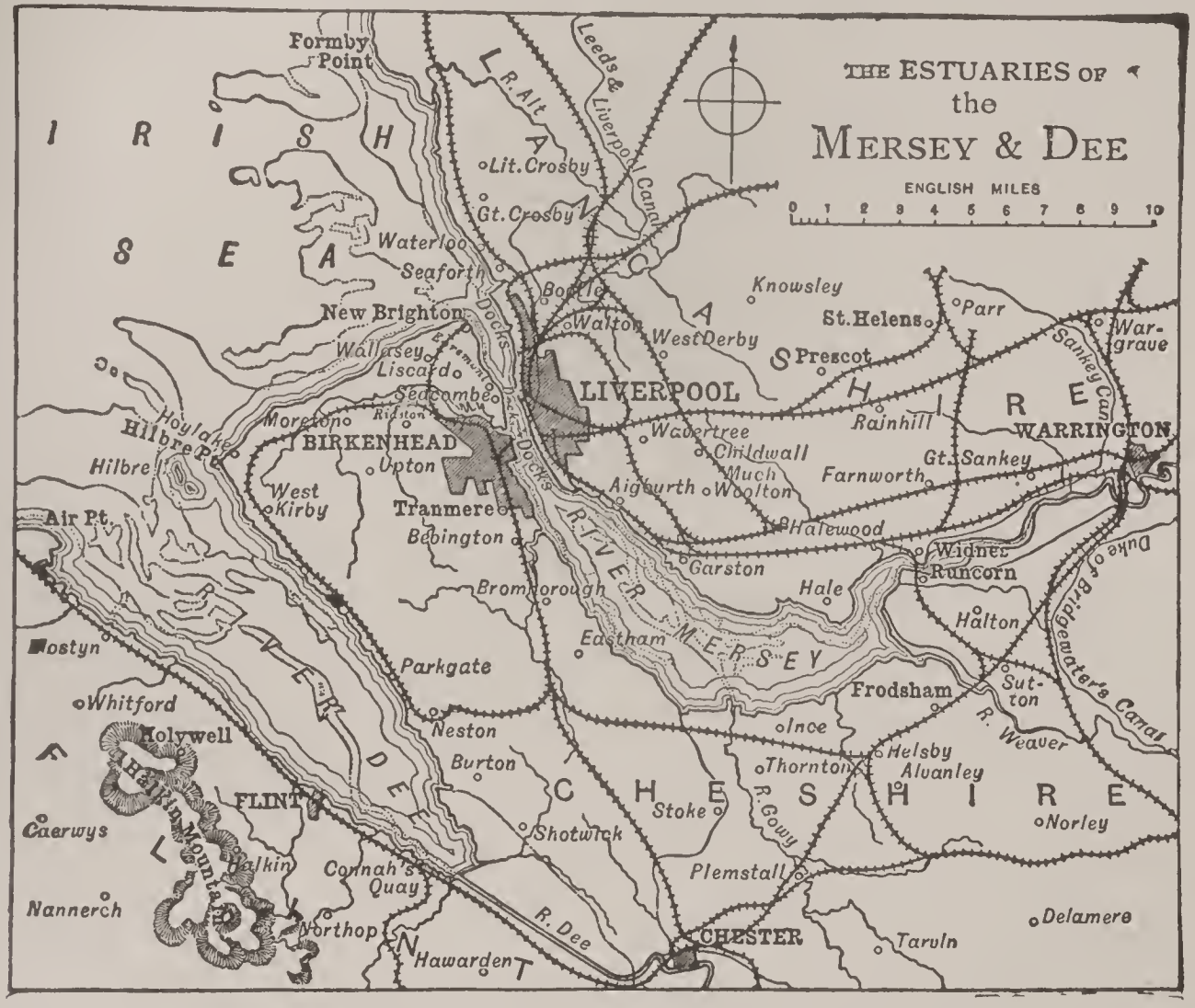
The functions of the liver would seem to be, at least, threefold. It serves (1) to secrete from the blood received from the stomach and intestines that amount of bile which is necessary for the purposes of digestion. The bile, however, contains waste matter, which has been separated from the blood. The liver, therefore, (2) has a direct function in separating and casting forth the waste impurities of the blood. Further, it appears from recent investigation that (3) the liver secretes a substance which is called *glycogen* or *animal starch.* The use of this substance, which is readily converted into sugar, would seem to be to supply the tissues with material for their energy and heat. The functions of the liver, however, still form the subject of dispute and investigation among physiologists. See *Bile* and *Gall-bladder.*

There are many diseases connected with this important gland. There is *congestion of the liver,* which indicates that the structure is surcharged and choked with blood. This arises from various causes; heart disease, disease of the lungs, or even excess in food or drink will produce congestion. The symptoms are excessive weight, fullness, and a tenderness in the organ, which may be proved by a slight push in the region beyond the breast-bone. *Inflammation of the liver* is frequent in hot countries; is closely connected with dysentery, and its symptoms are similar to those connected with congestion. *Cirrhosis of the liver* or *drunkard's liver* is frequently caused by excessive spirit-drinking—but not necessarily so, as it has been known to occur in children. The symptoms are many and not easily recognized; and the disease may remain for years before a fatal issue.

Fatty degeneration of the liver occurs when the cells become crowded with globules of oil, and it becomes large and pale. This result usually arises from overfeeding or drinking and want of exercise. See *Jaundice.*

Liver-fluke. See *Distoma.*

Liverpool (liv'er-pöl), a seaport of England, County of Lancaster, on the right bank of the Mersey, about 4 miles from its confluence with the Irish Sea, 185 miles northwest from London. Liverpool has had a rapid and recent growth. Camden speaks of 'Litherpoole commonly called Lirpoole' as the place 'where is the most convenient and most frequented passage to Ireland'; and it was the conquest of that country which gave the first impulse to the trade of Liverpool'; and in 1636 it was rated however, in the sixteenth century, so that it was mentioned in Queen Elizabeth's reign as 'her majesty's poor decayed town of Liverpool;' and in 1636 it was rated at £20 for ship-money when Bristol was rated at £1000. In 1709 the first wet-dock in the kingdom was erected at Liverpool, and from that time, but more particularly during the nineteenth century, its increase in wealth and influence has been immense. It stands partly on flat ground along the margin of the river, but chiefly on the slopes of a series of moderate eminences. The general appearance of the town has been greatly altered in recent years by the formation of new streets and by the widening of many old ones. In the central districts in particular the densely-peopled courts and narrow unhealthy alleys have been opened or demolished. The chief public buildings are the town hall, municipal offices, revenue buildings, St. George's Hall, exchange, public library and museum, art gallery, Picton reading-room, the Wellington rooms, government offices and law courts. The town hall is a Greek building dating from 1754, but greatly altered and extended since. It contains a fine suite of apartments, and serves as the official residence of the mayor. The municipal offices were completed in 1868, at a cost of £160,000. St. George's Hall, completed in 1854 at a cost of £250,000, is a building in the Grecian style, especially notable for the excellence and beauty of its architecture. The free public library and



museum—erected at the sole expense of the late Sir William Brown, a Liverpool merchant, and now maintained out of the public rates—is a handsome building of the Corinthian order. The exchange is an edifice of great magnitude, consisting of a center and two wings, with a frontage of 1500 feet. The provision markets are spacious, airy, covered buildings, and are five in number. The charitable and benevolent institutions, such as hospitals and infirmaries, etc., are numerous. The educational institutions include University College (affiliated to the Victoria University, Manchester), Liverpool College, the Royal Institution, the Liverpool Institute, School of Art and Gallery of Art, etc. The squares and open spaces of the city are not numerous, but it is exceptionally well provided with public parks, and around these many elegant private residences. Sefton Park (400 acres) is the largest. Next to London this city is the chief seaport in the United Kingdom. Immense docks lie along both sides of the Mersey, with a length of 8 miles, a quay space of 30 miles, and a total water area of over 500 acres (including those of Birkenhead). In connection with the river one of the principal features is the famous floating landing stage, its length of 2063 feet resting upon pontoons, which rise and fall with the tide. Among the imports cotton holds the chief place, followed by provisions and live-stock, cereals, fruits, hides, palm and olive oil, wine and spirits, tobacco, etc. Cotton goods form by far the principal export; other exports are machinery, woolens, etc. Manufacturing industries are varied, and include engineering, iron- and brass-founding, chemicals, sugar-refining, brewing, rope-making, etc. Liverpool is the chief port in Britain for the departure of emigrants. There are five approaches to the town by railway, and by the opening of the tunnel under the Mersey, the railway facilities have been materially increased. Liverpool is, next to London, the largest town in England, and the third in Great Britain, Glasgow being the second. The city is divided into sixteen wards, each of which returns three councilors. Since 1885 the representatives sent to Parliament have been increased from three to nine, the divisions within the city being—Kirkdale, Walton, Everton, West Derby, Scotland, Exchange, Abercromby, East Toxteth and West Toxteth. Pop. 746,566.

Liverpool, Robert Banks Jenkinson, Earl of, born in 1770; died in 1828. He entered Parliament under Pitt's auspices in 1790, and on his father being created Earl of Liverpool in 1796 he became Lord Hawkesbury. As foreign secretary in the Addington ministry he negotiated the treaty of Amiens, and he became home secretary in 1804. On the assassination of Percival, in 1812, he became premier, and held that position till 1827. His opposition to all liberal measures, the severity with which he repressed internal disturbances, and his prosecution of Queen Caroline rendered him extremely unpopular. His father, Charles Jenkinson, first Earl of Liverpool (1729-1808), held several subordinate offices in the government, and was the author of several political pamphlets, a collection of treaties, etc.

Liverpool Plains, lie in the northern interior of New South Wales, and were named by Mr. Oxley, the discoverer, in 1818 after Lord Liverpool. They form a pastoral area of over 16,000 square miles.

Liverpool Range, a mountain range of Australia whose length is about 150 miles, and its highest peak, Mount Oxley, is 4500 feet in height.

Liversedge (liv'er-sedj), a township in the W. Riding of Yorkshire. It has machine shops, textile works, etc. Pop. 14,660.

Livingston (liv'ing-stun), Edward, statesman, was born in Clermont, New York, in 1764. He was sent to Congress, from New York, in 1794, serving until 1801; from Louisiana, from 1822 to 1829, being then elected United States Senator. In 1831 he was Secretary of State; in 1833 was minister to France. In an extended knowledge of law he had probably no superior. He died in 1836.

Livingston, a city, capital of Park County, Montana, on the Yellowstone River, 25 miles E. of Bozeman. It has railroad shops and mining interests. Pop. 5359.

Livingstone (liv'ing-stun), David, missionary and one of the greatest of modern travelers, was born at Blantyre, Lanarkshire, in 1813, and died near Lake Bangweolo, Africa, May 1, 1873. His parents had settled in the neighborhood of the cotton mills near Blantyre, where David became a 'piecer' at the age of ten. While at work in the mill he learned Latin and read extensively, and having attended the medical and Greek classes at Glasgow University during the winter months, he finally became a licentiate of the Faculty of Physicians and Surgeons of Glasgow. Under the auspices of the London Missionary Society he proceeded in 1840 to South Africa, where he joined Robert Moffat in

the missionary field. His first station was in the Bechuana territory, and here his labors for nine years were associated with Mr. Moffat, whose daughter he married. Having heard from the natives that there was a large lake north of the Kalahari desert, he proceeded to explore that region, and discovered the valley of the Zouga and Lake Ngami. Subsequently he penetrated further northwest until he reached Linyanti, the capital of the Makololo territory, situated on the Chobe, a tributary of the Zambesi, which river he also visited. In 1853-56 he made a great exploring journey, or series of journeys. Starting from Linyanti he ascended the Leeambye (Upper Zambesi), journeyed overland to Lake Dilolo, and thence to St. Paul de Loanda on the west coast. Returning to Linyanti, he struck eastwards from there in 1855, tracing the Zambesi to the Indian Ocean, and reaching Quilimane on the east coast in 1856, having thus crossed the entire continent. The record of this journey is found in his *Missionary Travels and Researches in South Africa* (Lond. 1857). After making various journeys and exploring the Lake Nyassa and Zambesi region, Livingstone set forth in 1865 to set at rest the question of the sources of the Nile. From this time till his death he was engaged in laborious explorations in the lake region of South Africa, especially to the westward of Nyassa and Tanganyika, where he discovered Lakes Bangweolo and Moero, the Upper Congo, etc. For about three years no communication had come from him, and the doubts regarding the traveler's safety were only set at rest when it was known that H. M. Stanley, the special correspondent of the *New York Herald*, had seen and assisted Livingstone at Ujiji, on Lake Tanganyika. They parted in March, 1872, Livingstone going to explore the southern end of Tanganyika, and Stanley proceeding to Zanzibar. After another year's wanderings he was attacked with dysentery near Lake Bangweolo, and there died. His body was buried in Westminster Abbey, having been conveyed to the coast, rudely preserved in salt, by his faithful followers.

Livingstonia (liv'ing-stō'ni-a), a mission settlement of the Free Church of Scotland, established in 1875 on Cape MacClear, at the south end of Lake Nyassa, in Southern Africa.

Livius (liv'i-us), TITUS PATAVINUS, often called LIVY, a celebrated Roman historian, born at Patavium (Padua) in the year 59 B.C. Nothing is known of his life except that he came to Rome, secured the favor of Augustus, and became a person of some consequence at court, that he was married, and had at least two children, and that he died in his native town, according to some authorities, in A.D. 11, and to others, in A.D. 16 or 17. His Roman history begins at the landing of Æneas in Italy, and comes down to the year of the city 744 (B.C. 9). His whole work consisted of 140 or 142 books, of which we have remaining only the first ten, and those from the twenty-first to the forty-fifth, or the first, third and fourth decades, and half of the fifth. Of all the books, however, except two, we possess short epitomes or tables of contents. In the first ten books the history extends from the foundation of Rome in B.C. 753 to the year 294 B.C.; the portion between the twenty-first and forty-fifth books contains the account of the second Punic war and the history of the city between B.C. 219 and 201. The fourth and the half of the fifth decade bring down the history to the year B.C. 167. Livy makes no pretensions to the character of a critical historian; his grand purpose was to glorify his country, and he adopted all the legends of the early history without troubling his mind about their authenticity.

Livius Andronicus (liv'i-us andro-nī'kus), the father of Roman poetry, by birth a Greek of Tarentum, and resident in Rome at the beginning of the third century B.C. He introduced upon the Roman stage dramas after the Grecian model, and, besides several epic poems, wrote a translation of the *Odyssey* in the old Saturnine verse. We have only a few fragments of his writings.

Livonia (li-vō'ni-a), or RIGA, a government of Russia, including the island of Oesel, bounded west by the Baltic; area, 18,160 square miles. For the most part the country is flat and swampy, yet a great part is under cultivation and yields good crops of oats. The forests are extensive. The governing classes and landed proprietors are chiefly Germans and Russians, while the peasantry are mostly of Finnish and Lettish origin. The inhabitants are almost all Protestants. The capital is Riga. Pop. 1,295,231.

Livre (lē-vr), an old French money of account, not now in use, having been superseded by the franc. The *livre tournois* was worth 20 sous, about twenty cents; the *livre parisis*, 25 sous, about twenty-four cents.

Livy. See *Livius*.

Lixuri (liks-ö'rē), a seaport in Cephalonia, one of the Ionian Isl-

ands, a principal depot for wines and currants. Pop. 5484.

Lizard (liz'ärd), the popular name of numerous reptiles forming the order Lacertilia or Sauria, and having usually two pair of limbs and an elongated body terminating in a tail. The lizards number more than a thousand species, accommodating themselves to all conditions except cold, and increasing in size and number in tropical regions. In some the tongue is thick and fleshy and in others it is divided, while in most cases it is protrusible. Some lizards are vegetable feeders, but for the most part they are carnivorous and live upon small birds, insects, etc. The eggs are deposited and left to be hatched without care from the parents. The chief families of lizards are the Scincidæ, or Skinks; the Geckotidæ, or Geckos; the Iguanidæ, or Iguanas; and the Chamæleonidæ or Chameleons. Poison glands are wanting in the lizards; the only exception being the *Heloderma* of Arizona and Mexico, which is capable of inflicting a poisonous bite by means of poison glands connected with grooved teeth.

Lizard Point, a headland of England, in Cornwall, forming the most southern point of Great Britain, 24 miles E. S. E. of Land's End, and having two lighthouses with fixed lights 224 feet above sea-level; lat. 49° 57′ 42″ N.; lon. 5° 12′ W. Used as a reporting station for transatlantic vessels.

Lizard-stone, a name for the serpentine marble stone obtained in Cornwall, in the vicinity of the Lizard Point. It is worked up into chimney-pieces, ornaments, etc.

Llama (lä'ma or lyä'mä; *Auchenia*), an ungulate ruminating quadruped found in South America, closely allied to the camel, and included in the family Tylopoda. They differ from the camel in having no hump upon the back, in having a deeper cleft between the toes, the callous pad of the foot is less developed, and the interval between the canine and the back teeth is greater. The tail being short and the hair long and thick, the llama has the general appearance of a long-necked sheep, standing about 3 feet at the shoulder. Of the four known species the guanaco and the vicuña are found in a wild condition, while the llama and the alpaca have long been domesticated. The llama is used by the inhabitants of Chile and Peru to carry burdens after the manner of a camel. When loaded with about a hundredweight it can travel some 14 miles a day across the mountain passes. They are gentle and docile creatures.

Llandaff (lan-daf'; *Llan Tâf*, Church of the Tâf), an ancient city of South Wales, Glamorganshire; now a mere village, situated on the right bank of the Taff, 2 miles northwest of Cardiff. It is the seat of a bishop, its cathedral dating from the twelfth century.

Llandeilo-beds (lan-dī'lo), in geology, the name of one of the lower Silurian rock groups. See *Geology*.

Llandudno (lan-dud'nō), coast town and fashionable watering place in Carnarvon, Wales, on a peninsula between Orme's Bay and the estuary of the Conway. It has a fine parade, promenade pier, and affords excellent sea-bathing. There are interesting antiquities in the neighborhood. Pop. 9279.

Llanelly (lä-neth'li), a parliamentary borough of South Wales, in Carmarthenshire, situated on the Bury, 14 miles south by east of Carmarthen. It is the outlet for the products of extensive collieries, iron-foundries, copper, tin, lead, and silver works, in which a large number of the inhabitants are employed. The trade is facilitated by four commodious docks, from which great quantities of coal are exported. Pop. (1911) 32,077.

Llangollen (Welsh pron. *h*lån-goth'-len), a town of North Wales, county of Denbigh, 21 miles southeast of Denbigh, picturesquely situated in a narrow valley on the right bank of the Dee, greatly resorted to by summer visitants. Pop. (1911) 3250.

Llanos (lyä'nōs), the Spanish name given to the vast plains situated in the north part of South America, particularly in Colombia and the basin of the Orinoco. During the dry season the vegetation is burned up by the sun, while in the rainy period they are flooded with water. Between these two seasons the llanos are covered with thick grass and ranged by vast herds of cattle and horses. Farther south such plains are called *pampas*, and in North America *savannahs*.

Llanquihue (lyån-kē'wā), a southern province of Chile, situated between the Andes and the Pacific Ocean. Its area of nearly 8000 square miles is extremely fertile, yielding abundant harvests to its inhabitants, who are mostly Germans; capital, Puerto Mont. Pop. 78,315.

Llerena (lye-rā'nå), a city of Spain, in the province and 62 miles southeast of Badajoz. Pop. 7049.

Lloyd-George, DAVID, a British cabinet officer, born at Manchester in 1863, of Welsh descent,

and educated in Wales. He became a solicitor in 1884, was elected to Parliament from the Carnarvon boroughs in 1890, and acquired a reputation for ability and radicalism. He fearlessly opposed the Boer war, despite the prevailing sentiment, earnestly championed the cause of the workingmen, and distinguished himself by settling a great cotton strike and averting a serious railway strike. After the Liberal victory of 1905 he was made president of the Board of Trade, and entered the Asquith cabinet of 1908 as chancellor of the exchequer. As such he brought in a budget taxing the unearned increment of landed estates and forced its passage, despite vigorous opposition in the House of Lords. In the contest the existence of this House was seriously threatened. In a general election he was sustained by the entire country. In 1912 he secured the passage of a bill providing compulsory insurance against sickness and unemployment.

Llorente (lyo-ren'tā), JUAN ANTONIO, a Spanish historian, born in 1756; died in 1823. He received his education at Tarragona, entered the clerical order in 1776, was made a priest in 1779, became vicar-general of Calahorra in 1781, and chief-secretary to the Inquisition in 1791. When the Inquisition was suppressed by order of Napoleon and the Cortes, Llorente received many documents connected with it, and published his *Critical History of the Inquisition in Spain* in 1817. Having been exiled from Spain on the return of Ferdinand VII, in 1814, he resided first in England and then in Paris, where he published (1822) his *Portraits Politiques des Papes*, a work which enraged the French clergy, and caused its author to be expelled from France.

Lloyd's (loidz), an incorporated society of persons engaged in marine insurance in London, or otherwise connected with shipping, having rooms in the London Royal Exchange. Members are admitted by subscription and the affairs of the institution are conducted by a committee. Reports are received daily from all foreign ports, and this information is posted in the common or merchants' room. Lloyds List, containing shipping reports, is published daily, and Lloyd's Register of shipping is issued annually. Originally the London underwriters met at Lloyd's Coffee-house, hence the name. See *Insurance*.

Lô, ST. (saṇ lō), a town of France, capital of the department of La Manche, on the right bank of the Vire, 158 miles west by north of Paris. Pop. 8959.

Loach (lōch), a small fish (*Cobītis barbatŭla*) inhabiting small clear streams in England, and esteemed dainty food. A smaller species, the spined loach or groundling (*C. tænia*), also occurs in England. The name is also given to the eel-pout (*Lota vulgāris*) and the three-bearded rockling (*Motella vulgāris*).

Load-line (lōd-līn), is a line drawn on the side of a ship to indicate that if she is loaded so as to sink deeper she is overloaded.

Loadstone, LODESTONE (lōd'stōn; Fe_3O_4), an ore of iron, consisting of the protoxide and peroxide in a state of combination, and frequently called the magnetic oxide of iron. It was known to the ancients, and they were acquainted with the singular property which it possesses of attracting iron to itself. See *Iron Magnet*.

Loam (lōm), a soil compounded of various earths, of which the chief are sand, clay and carbonate of lime or chalk, the clay predominating. Decayed vegetable and animal matter, in the form of humus, is often found in loams in considerable quantities, and the soil is fertile in proportion.

Loan (lōn), anything lent or given to another on condition of return or payment. In law loans are considered to be of two kinds—*mutuum* and *commodate;* the former term being applied to the loan of such articles as are consumed in the use, as provisions or money; the latter to the loan of such articles as must be individually returned to the lender. The acknowledgment of a loan of money may be made by giving a bond, a promissory note, or an I. O. U., the last of which requires no stamp.

Loanda (lō-ăn'da), ST. PAUL DE, a seaport town and island in Southwestern Africa. The town is a bishop's see, and the chief settlement of the Portuguese in this part of Africa. Principal exports, ivory and bees'-wax. Pop. 20,106. The island, opposite the town, and separated from the mainland by a narrow channel, is about 18 miles in length and 2 miles in breadth. It contains seven or eight villages.

Loango (lō-an'gō), a maritime country in Africa, stretching northward from the Congo along the Atlantic. The chief products are palm-oil, gum, caoutchouc, coffee, cotton, etc. Neither horses, cows, sheep, nor asses thrive. The population is dense, but barbarous and superstitious. The country now belongs chiefly to France.—LOANGO, the chief town, is a collection of huts and factories.

Lobbyists, a term applied to men who make a business of corruptly influencing legislators, by means of money paid to the members, or by any other method that is considered feasible. Many women engage in this work as well as men. The term lobby, which literally means the ante-rooms of legislative halls, has come to be applied to these people who frequent them, and they are sometimes styled the Third House.

Löbau (*leu'*bou), a town of Prussia, province of West Prussia. It has considerable manufactures and an active trade. Pop. 10,683. There is a town of the same name in Saxony, 12 miles S. E. of Bautzen, with woolen and linen mills and a pop. of 4451.

Lobelia (lō-bē'li-a; named after Matthew Lobel, physician and botanist to James I), a very extensive genus of beautiful herbs, natives of almost all parts of the world, especially of the warmer parts of America, tribe Lobeliaceæ, nat. order Campanulaceæ. *L. inflāta* is the Indian tobacco, which is cultivated in North America, and is employed in medicine. The small blue lobelia so popular in gardens is *L. Erinus*, a Cape species. A brilliantly scarlet-flowered species, *L. cardinālis*, is the cardinal-flower. *L. siphilitica*, an American species, possesses emetic, cathartic and diuretic properties. Two species are found wild in Britain.

Lobeliaceæ (lō-bē-li-a'se-ē), a tribe of Campanulaceæ, differing from Campanulaceæ proper in having irregular flowers, and like the Compositæ syngenesious anthers, but otherwise resembling them very nearly.

Lobipedidæ (lō-bi-ped'i-dē), a family of aquatic grallatorial birds, including the coots and phalaropes.

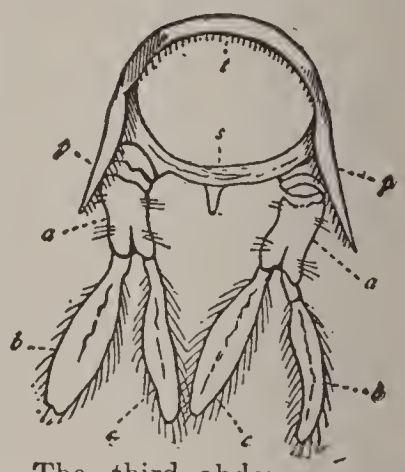
Loblolly-bay (lob'lol-i), the popular name of *Gordonia Lasianthus*, nat. order Linaceæ, an elegant ornamental evergreen tree of the maritime parts of the Southern United States, having large and showy white flowers. It grows to the height of 50 or 60 feet.

Loblolly-pine (*Pinus tæda*), an American pine, next to the white pine the loftiest in North America. Its leaves are 6 inches long, united by threes or fours. Its timber is of little value.

Lob-Nor (lōb-nōr), a salt lake in Central Asia, in Eastern Turkestan, which receives the river Tarim.

Lobos (lō'bos), or SEAL ISLANDS, three islands in the Pacific Ocean, off the coast of Peru, lat. 6° 29′ S., lon. 80° 53′ W. The largest, called Lobos de Tierra, is 10 miles distant from the mainland, and is about 5 miles long, and 2 miles broad at the widest part. Large quantities of guano have been obtained from these islands.

Lobster (lob'ster), the common name of the macrurous (long-tailed), decapodous (ten-footed), stalk-eyed crustaceans, belonging to the genus *Homărus*. The first pair of ambulatory limbs bear the well-known and formidable lobster-claws. The abdomen has rudimentary limbs on its under side, among which are lodged the newly excluded spawn. The tail consists of several flat shelly plates capable of being spread like a fan, and used as a swimming organ. Lobsters inhabit the clearest water, living in the crevices of a rocky bottom. Lobsters are esteemed a very rich and nourishing aliment, but dangerous unless fresh and in good condition. They are generally in their best season from the middle of October till the beginning of May. The common lobster (*H. vulgāris*) is found in great abundance on many of the European shores. *H. Americānus* is found on the coasts of North America, and is largely taken for sale, so largely that its numbers are rapidly diminishing. It is closely allied to *H. vulgāris*. The fresh-water lobster is the crawfish or crayfish.



The third abdominal segment of the Lobster. *t*, Dorsal arch; *s*, Ventral arch of the segment; *a*, Protopodite; *b*, Exopodite; *c*, Endopodite.

Lobworm (*Arenicŏla piscatōrum*), a genus of Annelida or Worms. It has a round, obtuse head, a body about the size of a large earthworm, and respires through thirteen pairs of gill-tufts. Traces of the lobworm may be found on every sea-beach in the little coils of sand which it leaves when burrowing after the tide has ebbed. It is used for bait in deep-sea fishing. It is called also *Lugworm*.

Local Option, a term applied to the principle by which a certain majority of the inhabitants of a certain locality may decide as to whether any, or how many, places for the sale of intoxicating liquors shall exist in the

locality. Many of the States of this country have such laws, which differ in specific details, and through their operation the sale of liquor has been forbidden in a large part of certain States in which no general prohibition law has been passed. Within late years there has been a very active movement in this direction, and while a number of States had adopted complete prohibition, various others have achieved almost state-wide prohibition through the exercise of local option laws. In Illinois, for instance, there are 1500 prohibition towns, and full license exists in only a few counties. Kentucky has 96 prohibition counties, the area open to liquor sale being very small. Other States in which local option prohibition is widespread are Minnesota and Ohio, and it has made much progress in Massachusetts and several other States. Local option and prohibition have made little progress in foreign countries. An effort to pass a licensing bill that dealt severely with liquor interests was made in England in 1908, but was defeated in the House of Lords, party leaders assuming that public opinion was not ready for such a measure. See *License* and *Prohibition Party.*

Locarno (lō-kär'nō), a small town of Switzerland, formerly one of the three capitals of the Canton Ticino, in a charming but unhealthy locality on Lago Maggiore. Pop. 3603.

Locative Case (lok'a-tiv), in grammar, is the case expressive of locality. Such a case existed originally in all the Aryan languages; in Sanskrit all nouns and pronouns have a locative case.

Lochaber-axe (loh-ā'bėr-aks; from *Lochaber*, a district in Inverness-shire), a weapon, consisting of a pole bearing an axe at its upper end, formerly used by the Highlanders of Scotland.

Loches (lōsh), a town of France, dep. of Indre-et-Loire, on the left bank of the Indre, 29 miles southeast of Tours. In its castle several kings of France resided, and Louis XI used it as a State prison. Pop. (1906) 3751.

Loch Katrine. See *Katrine, Loch.*

Loch Leven. See *Leven.*

Loch Lomond. See *Lomond, Loch.*

Lock (of firearms). See *Musket, Revolver, Rifle*, etc.

Lock, an inclosure in a canal, with gates at each end, used in raising or lowering boats as they pass from one level to another. When a vessel is descending, water is let into the lock till it is on a level with the higher water, and thus permits the vessel to enter; the upper gates of the lock are then closed, and by the lower gates being gradually opened, the water in the lock falls to the level of the lower water, and the vessel passes out. In ascending the operation is reversed, that is, the vessel enters the lock, the lower gates are closed, and water is admitted by the upper gates, which, as it fills the lock, raises the vessel to the height of the higher water.

Lock, an appliance used for fastening doors, chests, drawers, etc. A good lock is the masterpiece in smithery, and requires much art and delicacy in contriving and varying the wards, springs, bolts, and other parts of which it is composed, so as to adjust them to places where they are serviceable, and to the various occasions of their use. The principle upon which all locks depend is the application of a lever to an interior bolt, by means of a communication from without, so that by means of the latter the lever acts upon the bolt, and moves it in such a manner as to secure the door or lid from being opened by any pull or push from without. The security of locks in general, therefore, depends on the number of impediments that can be interposed between the lever (the key), and the bolt which secures the door, and these impediments are known by the name of *wards* (which slip into corresponding grooves of the key), the number and intricacy of which are supposed to distinguish a reliable lock from one that may be easily picked. The Yale Lock, invented by Linus Yale, now in very common use, is a distinct step in advance of the tumbler lock, and does away with the idea that a big key is necessary for a safe fastening. It contains pins held down by a spring, and which can be lifted only by a key fitted in contour to meet them. As the combinations of the pins can be greatly varied, the keys may be similarly diversified. The time-lock is one in which clock-work operates the combinations so that it can be opened only at a particular hour. See also *Chubb-lock.*

Locke (lok), JOHN, eminent English philosopher, was born at Wrington, in Somersetshire, in 1632, and died in 1704 at Oates in Essex. He was sent to Westminster School; from there he went to Christ Church, Oxford, and applied himself to the study of medicine. In 1666 Locke made the acquaintance of Lord Ashley, afterwards Earl of Shaftesbury, and held various offices in the patronage of that nobleman. When, in

1682, his patron was obliged to retire, for political reasons, to Holland, Locke accompanied him in his exile. Owing to the troubled condition of his country, and the continued triumph of the party which he had opposed, Locke continued to reside abroad. He returned to England at the Revolution, and was appointed commissioner of appeals under the new government. So early as 1670 Locke had formed the plan of his famous *Essay on*

John Locke.

the Human Understanding, a plan which he had carefully elaborated in his exile, and which he published in its completed form in 1690. It was received with much opposition, notably by the University of Oxford, who resolved to discourage it; but despite this it acquired a great reputation throughout Europe, and was translated into French and Latin. Locke was made a commissioner of trade and plantations in 1695, but retired when unable to perform its duties, and lived with his friend, Sir F. Masham, until his death. Briefly, it may be stated that the chief purpose of Locke's celebrated *Essay* was to find the original sources and the scope of human knowledge. The conclusions he arrived at were that there is no such thing as an 'innate idea'; that the human mind is a sheet of white paper prepared to be written upon; that the knowledge thereon written is supplied by experience; and that 'sensation' and 'reflection' are the two sources of all our ideas. Among other works of Locke are three *Letters on Toleration; Thoughts Concerning Education; Reasonableness of Christianity;* two *Treatises on Government; Notes upon St. Paul's Epistles to the Galatians, Corinthians, Romans and Ephesians;* and a *Treatise on the Conduct of the Understanding.*

Lockhart (lok'härt), JOHN GIBSON, author, and editor of the *Quarterly Review*, was born at Cambusnethan in 1794, and died at Abbottsford in 1854. He was educated at Glasgow University; gained an exhibition at Baliol College, Oxford; studied for the Scottish bar, but never practised; and began his literary career in 1817 as a contributor to the newly-established *Blackwood's Magazine.* In 1820 he married the daughter of Sir Walter Scott, and in 1826 succeeded Mr. Gifford as editor of the *Quarterly Review*, a position which he occupied for twenty-seven years. His *Life of Sir Walter Scott* is highly esteemed.

Lock Haven (lok-hā'vn), a city, capital of Clinton county, Pennsylvania, on the west branch of the Susquehanna River, 25 miles S. W. of Williamsport. It contains a State normal and other academic schools, is in a pine forest district and has large lumber mills, tanneries, planing mills, paper, fire bricks, and other works. Pine lumber is its chief export. Pop. 7772.

Lockport (lok'port), a city, capital of Niagara county, New York, on the Erie Canal, 25 miles E. N. E. of Buffalo. It is built on the declivities of a long ridge, and the canal here has 5 locks, carrying it down 60 feet from the Lake Erie to the Genesee level. This yields abundant water power, which is utilized in the many mills and factories of the city. Its industries include ironworks, pulp, paper and fiber mills, and various other manufactures. Near by are large limestone quarries, affording an excellent building material. Pop. 17,970.

Lockwood (lok'wụd), BELVA ANN, MRS., lawyer, born at Royaltown, New York, in 1830. She was instrumental in inducing Congress to pass a law giving equal pay for equal services in government offices to women and men. She was admitted to the bar in Washington in 1879, and took part in important law cases. Was nominee of the Equal Rights party for President in 1884 and 1888. Was a delegate to the Arbitration Convention, New York, and the International Peace Congress, London, 1907.

Lockyer (lok'yer), JOSEPH NORMAN, an English astronomer, born at Rugby in 1836, and educated privately. He entered the War Office in 1857; became astronomical lecturer at South Kensington, and directed the eclipse expedition to Sicily in 1870, and to India in 1871. His reputation rests upon his discoveries in spectrum analysis and his theory of astronomical evolution. His contributions to literature include *Elementary Lessons in Astronomy* (1868), *Studies in Spectrum Analysis*

(1872), *Solar Physics* (1874), *Star-gazing* (1877), *the Chemistry of the Sun* (1887), and *Meteoric Hypothesis* (1890), the latter his most notable contribution to science.

Locle (lok'l), a town of Switzerland, in the canton and 10 miles W. N. W. of Neufchâtel. It has important manufactures of clocks and watches, and a school of watchmaking. Pop. 12,626.

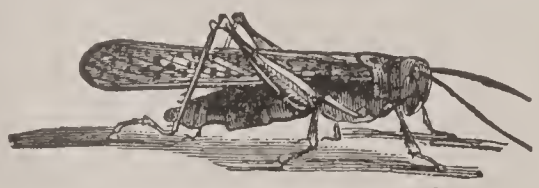
Locomotive Engine. See *Steam Engine Locomotive;* also *Oil.*

Locomotor Ataxy (lō-k u-mō'tor), is a peculiar disease of the nervous system, deriving its name from the fact that the sufferer from it cannot order the movements of his limbs for definite purposes. The patient requires to guide his feet and legs by means of his sight, and even then the feet are jerked out and brought down in a violent way. This difficulty of movement is called 'want of coördination of movement.' The causes of this disease are obscure, its progress usually extends over a number of years, and recovery is rare. Also called locomotor ataxia.

Locris (lō'kris), the name of two portions of ancient Greece, the one on the east opposite the island of Eubœa; the other on the west, on the north side of the Corinthian Gulf. The Locrians played an unimportant part in Greek history, but a city established by them in Southern Italy, in the Bruttian peninsula (or toe of Italy), attained a very flourishing condition.

Locus (lō'kus), in geometry, the line traced out or generated by a point which is constrained to move in accordance with certain determinate conditions; thus, the *locus* of a point moving in a plane, and which must preserve the same uniform distance from a fixed point, is a circle.

Locust (lō'kust), the name of several insects of the order Orthoptera, of which the genus *Locusta* is a type, allied to the grasshoppers and crickets. Their hind legs are large and powerful, which gives them a great power of leaping. Their mandibles and maxillæ are strong, sharp and jagged, and their food consists of the leaves and green stalks of plants. They fly well, but are often conveyed by winds where their own powers of flight could not have carried them. The most celebrated species is the migratory locust (*L. migratoria*). It is about 2½ inches in length, greenish, with brown wing-covers marked with black. Migratory locusts are most usually found in Asia and Africa, where they frequently swarm in countless numbers, darkening the air in their excursions, and devouring every blade of the vegetation of the land they light on. They are destructive both in the larval, nymph, and perfect conditions. The Arabs and others use them as food. When dried in the sun they are pounded up and baked into bread, or fried in oil as a delicacy. In the United States locusts are usually known as 'grasshoppers.' There are two specially destructiv species, one of which, *Caloptēnus femurrubrum*, is found in Northern New England and Canada; and the other, *Caloptēnus spretus*, breeds abundantly west of the Mississippi. In the summer months occasionally the latter species commits widespread ravages in Texas, Kansas and Colorado.



Locust (*Locusta migratoria*).

Locust, Seventeen Year. The insect known in the United States by this name is really a Cicada, of the order Homoptera. It is remarkable from the fact that the larvæ remain underground for seventeen years, sucking the juices of roots of trees and plants. Then they emerge in great numbers, assume the mature state, and live for a brief period, during which they do great d mage to the foliage of trees. The new brood quickly bore their way into the ground for another seventeen-year existence. There is also a thirteen-year brood in the southern range of States. Each year may have its brood in different sections of the country.

Locust-beans. See *Carob-tree.*

Locust-tree, or ACACIA (*Robinia pseudacacia*, nat. order Leguminosæ), is found in the Eastern United States, but grows to its best in Kentucky and Tennessee. There it acquires a girth of 4 feet and a height of 80 feet. The leaves are pinnate, smooth, prickly at the base; the flowers grow in pendulous racemes, white, fragrant, and producing smooth pods. The wood of the locust-tree is highly valued for certain purposes, being close-grained, tough, light and elastic in the best variety; it is reddish-tinted. It is used for housework, fences, railway sleepers, cabinet-making, etc.

Lodge (lodj), GEORGE CABOT, poet, was born at Boston in 1873, the son of Henry Cabot Lodge. He studied at the University of Paris, served

through the Spanish-American war, and afterward was private secretary for his father till his death in 1909. He published *Song of the Wave* (1898), *Poems* (1902), *Cain* (a drama, 1904), and *The Great Adventure* (1905). His poetic work was highly regarded.

Lodge, HENRY CABOT, statesman and author, was born in Boston, Massachusetts, in 1850. He was graduated from Harvard Law School in 1874. Distinguished as a writer on economic, financial and commercial subjects; he served as Representative in Congress from Massachusetts from 1887 to 1893, and was transferred to the Senate in the latter year. He has since been prominent in the Senate.

Lodge, SIR OLIVER JOSEPH, scientist, was born at Penkhull, England, in 1851. In 1880 he was appointed professor of physics at the new University College, Liverpool, and in 1887 was elected a fellow of the Royal Society. His chief studies have been in electricity, in which he has made discoveries of importance. He is a prominent member of the Society for Psychical Research, has been its president, and is deeply interested in its work, being an advocate of the theory of spirit return. Among his works are *Modern Views of Electricity*, *Pioneers of Science*, *Life and Matter*, *Electrons* and *The Ether of Space*. He was knighted in 1902.

Lodge, THOMAS, dramatist, was born in Lincolnshire, England, in 1555, and died of the plague in 1625. He came up to London from Oxford University and entered Lincoln's Inn as a law student in 1584, and after becoming an actor and a soldier he studied medicine and practised in London. He published his tale of *Rosalynde, Euphues' Golden Legacie* (1590), which was the source of Shakespere's *As You Like It;* the drama of *Marius and Sylla* (1594); and in conjunction with Greene he wrote *A Looking Glasse for London and England* (1594).

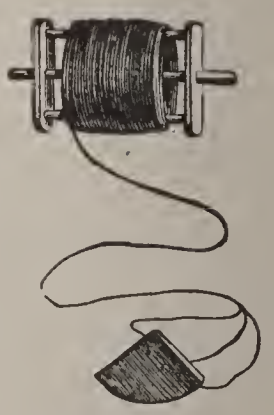
Lodi (lō'dī), a town in North Italy, in the province of Milan, in a fertile plain on the right bank of the Adda, 18 miles southeast of Milan. The principal buildings are the cathedral, a Gothic structure of the twelfth century, and the Church of the Incoronata. The manufactures consist of majolica, silk, linen and the great article of trade is Parmesan cheese. Here Napoleon effected the famous passage of the Bridge of Lodi against the Austrians on May 10, 1796. Pop. of town 19,970; of commune 26,827.

Lodz (löj; Russian, *Lodsi*), a town in Russian Poland, in the government of Piotrokow, 76 miles southwest of Warsaw, and next to it the most populous town in Poland. It has extensive trade and manufactures, especially in woolens and cottons. Pop. 351,570.

Loess (lō'es; German pron. leus), a German term applied in geology to a finely comminuted sand or pulverulent loam of a yellowish color which occurs as a pleistocene alluvial deposit chiefly in the valleys of the Rhine, the Danube, the Missouri, and some other rivers. It consists chiefly of argillaceous matter combined with carbonate of lime, quartzose and micaceous sand.

Lofoden (lo-fō'den), or LOFO'TEN, a group of islands off the northwest coast of Norway, and stretching southwest to northeast about 175 miles. They have almost all bold, precipitous, rugged and deeply-indented coasts, and an elevated and very sterile interior. The chief value of the group is derived from the immense shoals of cod and herring which frequent them, and the extensive and valuable fisheries which are consequently carried on at the proper seasons, about 8000 boats and 30,000 fishermen being employed. The principal cod-fishery ends in April, when the herring-fishery begins and continues during the summer. The celebrated whirlpool, the Maelstrom, is situated at the southern extremity of these islands. Pop. 42,818.

Log, a contrivance used to measure the rate of a ship's velocity through the water. For this purpose there are several inventions, but the one most generally used is the following, called the *common log.* It is a piece of thin board, forming the quadrant of a circle of about 6 inches radius, and balanced by a small plate of lead nailed on the circular part, so as to swim perpendicularly in the water, with the greater part immersed. One end of a line, called the *log-line*, is fastened to the log, while the other is wound round a reel. When the log is thrown out of the ship while sailing, as soon as it touches the water it ceases to partake of the ship's motion, so that the ship goes on and leaves it behind, while the line is unwound from the reel, so that the length of line unwound in a given time gives the rate of the ship's sailing. This is calculated by knots made on the line at certain distances, while the time is measured by a sand-glass running a certain number of seconds. The length



Ship's Log.

between the knots is so proportioned to the time of the glass that the number of knots unwound while the glass runs down shows the number of nautical miles the ship is sailing per hour. Thus, if the glass be a half-minute one, it will run down 120 times in an hour. Now, since a nautical mile contains about 6076 feet, the 120th part of this is about 50 2-3 feet; so that if the spaces between the knots be 50 2-3 feet, the number of knots and parts of a knot unwound from the reel in half a minute is the number of miles and parts of a mile the ship runs in one hour.

Log. See *Log-book*.

Logan (lō′gan), JOHN, a Scottish poet and clergyman, born in 1748; died in 1788. His name is now chiefly known in connection with a celebrated *Ode to the Cuckoo*, declared by Logan to have been written by himself, but which appears rather to have been the work of Michael Bruce (which see).

Logan, JOHN A., statesman and soldier, was born in Jackson county, Illinois, in 1826. In the Mexican war he did good service, and in 1858 and 1860 was elected to Congress. In the Civil war his services were very important, he being engaged in many battles, and being promoted from colonel to commander of a corps. In 1866 he was re-elected to Congress, and was one of the seven members chosen to manage the impeachment of President Johnson. He served until 1871, when he became Senator. He died in 1886.—His son, MAJOR JOHN A. LOGAN, took part in the Cuban war of 1898 and was slain in the Philippines in 1899.

Logan, SIR WILLIAM EDMOND, a Canadian geologist, born in 1798 at Montreal, educated chiefly in Europe. He devoted himself to the study of the geology of Canada, and was the chief of the Geological Survey of Canada from 1843 to 1871. He assisted also in the geological survey of Britain. He died in 1875 in Wales.

Logan, a city, capital of Cache county, Utah, 97 miles N. of Salt Lake City, situated at an elevation of 4507 feet. Here is a State agricultural college, a government experiment station, and the Brigham Young College. Pop. 7522.

Loganiaceæ (lō-gan-i-ā′se-ē), a nat. order of tropical dicotyledonous plants.

Logansport (lō′ganz-port), a city, capital of Cass county, Indiana, is situated on the Wabash at the mouth of Eel River, 75 miles N. by W. of Indianapolis. It has good railroad connections and is an important shipping point for grain, lumber, pork, etc. It manufactures water wheels, car trucks, machinery, baskets, automobiles, etc. Here is the Northern Indiana Hospital for the Insane and several collegiate institutions. Pop. 19,050.

Logarithms (log′a-rithmz). The common logarithm of a number is the index of the power to which 10 must be raised to be equal to the number. Thus $10^3=1000$, so that the logarithm of 1000 (usually written log. 1000) is 3. Now $10^1=10$, $10^2=100$, $10^3=1000$, $10^6=1,000,000$, and it is well known that $10^0=1$, $10^{-1}=0.1$, $10^{-2}=0.01$, etc., thus—

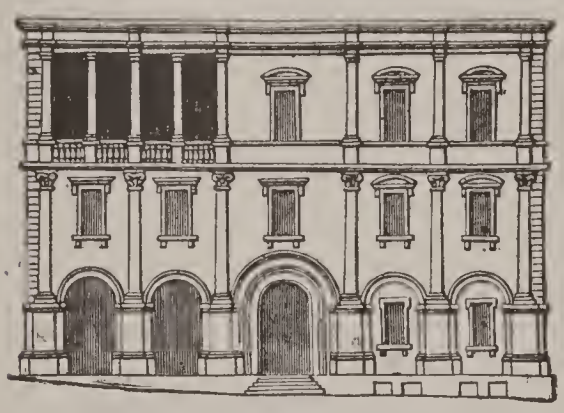
Log. 0.001 = — 3	Log. 10 = 1
Log. 0.01 = — 2	Log. 100 = 2
Log. 0.1 = — 1	Log. 1000 = 3
Log. 1 = — 0	Log. 10,000 = 4

It is evident that the logarithm of any number greater than 1 and less than 10 is fractional; the logarithm of any number greater than 10 and less than 100 is greater than 1 and less than 2. Again, the logarithm of any number less than 1 is negative. Suppose we wish to know the logarithm of the number 18.1. In a book of tables we only find the fractional part of the logarithm, it is .257679. Now 18.1 is greater than 10 and less than 100, so that its logarithm is greater than 1 and less than 2: hence log. 18.1 = 1.257679. The integral part of a logarithm is called its *characteristic*, the fractional part its *mantissa*. Logarithms make arithmetical computations more easy, for by means of a table of them the operations of multiplication, division, involution or the finding of powers, and evolution or the finding of roots, are changed to those of addition, subtraction, multiplication and division respectively. For instance, if x and y are the logarithms of any two numbers, the numbers are 10^x and 10^y; now the product of these numbers is 10^{x+y}, so that the logarithm of the product of two numbers is the sum of the logarithms of the numbers. Again, the quotient of the numbers is 10^{x-y}; so that the logarithm of the quotient of two numbers is the difference of the logarithms of the numbers. Again, 10^x raised to the nth power is 10^{nx}; so that the logarithm of the nth power of a number is n times the logarithm of the number. Logarithms of this kind are *common logarithms*, and were invented by Briggs; their *base*, as it is called, is 10. Logarithms were first used by Napier of Merchiston (see *Napier, John*), and he employed a base which is smaller than 10, namely, the number 2.7182818....., or

the sum of the infinite series $2+\frac{1}{2}+\frac{1}{2.3}+\frac{1}{2.3.4}+$, etc. This base is denoted by *e* in mathematical treatises, and the *Napierian* logarithm of any number, say 7, is log*e* 7, to distinguish it from log. 7, which is the common logarithm, whose base is 10. The common logarithm of a number is found from the Napierian by multiplying by 0.43429448. Napierian logarithms are of great importance in the higher mathematics.

Log-book, a book kept in ships and into which the direction of the wind, course of the ship, state of the weather at all hours of the day, are daily transcribed at noon, together with every circumstance deserving notice that may happen to the ship or within her cognizance, either at sea or in a harbor, etc.

Loggia (loj'à), a word used in Italian architecture with several significations. First, it is applied to a hall open on two or more sides, where there are pillars to support the roof, such as the Loggia de' Lanzi in Florence. It is also applied to an open colonnade or arcade surrounding a court, or to an open gallery at the height of one or more stories in a building. The name loggia is also given to the large ornamental window, consisting of several parts, which is often seen in old Venetian palaces, and lastly, it is used to designate a small airy hall, usually open on all sides, constructed on the roof of an edifice.



Loggia, Palace at Montepulciano.

Logic (loj'ik), a department or division of mental science which has been differently defined by authorities. The older school of logicians agreed on the whole in considering it as mainly treating of reasoning and the operations of mind subsidiary to reasoning; and this definition sufficiently indicates the view of the science held by such logicians as Whately and Hamilton. According to them logic dealt only with the *form* of thought, that is, with what is common to all reasonings, judgments, and concepts respectively, and had nothing to do with the *matter*, that is, the subject or content of reasonings, judgments, etc. In this view the science of logic was merely *deductive*, and the syllogistic process, or the intellectual act performed in deducing particular truths from general truths already given, was the main subject of the science. It is evident, however, that in practical research there is another movement or process of the mind of at least equal importance,—viz., the process by which the mind reaches general truths from the observation of particulars. This latter is the *inductive* process, and on it, regarded as the more important element in inference and the ascertainment of truth, John Stuart Mill founded his new system of *inductive logic*. The nature of scientific evidence, the methods and principles involved in scientific research, are the chief subjects of study in this system of logic. Very different from both of these are the conceptions of logic given by the chief German philosophers. Kant, in declaring that only the matter (not the form) of experience was given to the mind, had recognized thought as the essential factor of cognition, and had initiated a new so-called *transcendental logic*, which was an analysis of the general conditions under which the objective world became cognizable. Thus the foundation was laid for a view of reality as in its very nature constituted by thought. Thought or the *ego* is itself the real, and there being no separate reality logic becomes the system of the forms in and through which thought or intelligence is realized. Logic thus appears, as in Hegel, a complete theory of knowledge and a metaphysic. The earliest work on logic is the Organon of ristotle, who practically gave the science the shape it possesses. See *Deduction*, *Induction*, *Fallacy*, *Syllogism*, etc.

Logomania (log-u-mā'ni-a), a disease of the faculty of language generally associated with organic disease of the nervous structure, as in paralysis. In this disease, while conceptions and ideas remain clear, the power of associating these with the words by which they are expressed is lost, and the patient can either not give any names to his conceptions at all or expresses them erroneously. Sometimes one class of words is lost, and others retained. Thus a patient may forget his own name, or nouns only, and remember all other words. Sometimes he forgets only parts of the word, as terminations, and not unfrequently in another form he inverts his phrases.

Logos (log'os; Greek, word, thought, reason), in Christian theology, a word used in certain passages of the

Scriptures, which has been the source of continual disputes ever since the third century of our era. The passage in the Bible which gives rise to this discussion is the opening of the Gospel of St. John: 'In the beginning was the Word, and the Word was with God, and the Word was God. The same was in the beginning with God. All things were made by him, and without him was not anything made that was made,' etc. In the Greek text the expression here translated *Word* is *logos*, and the question is, what are we here to understand by *logos*, whether a person of the Deity, the creative intellect of God, or the Son, through whom he created, or the divine truth which was to be revealed, or something else?

Logroño (lo-grōn′yō), a town of Spain, capital of the province of same name in Old Castile, on the right bank of the Ebro, which is crossed by a new stone and a new iron bridge. It is well built, and has several interesting churches. Pop. 19,237.—The province, in the north, where it borders the Ebro, is level and fertile, but in the south is generally mountainous and barren. It is rich in minerals, but is quite undeveloped in this respect. Area, 1946 square miles; pop. 189,376.

Logwood (log′wụd), a popular name for the *Hæmatoxylon Campechianum*, a tree belonging to the nat. order Leguminosæ, which grows in moist and swampy places in Central America, and particularly round the Bay of Campeachy; but is now naturalized in Jamaica and many of the West Indian islands. The tree is usually from 40 to 50 feet high, with pinnate leaves and small yellowish flowers. The wood is red in color, tinged with orange and black, so heavy as to sink in water, and susceptible of receiving a good polish. It is used chiefly as a dyewood, the trees being cut down, the bark and alburnum removed, and the hard center parts cut into 3-foot-long logs. To obtain the coloring matter it is hewn into much smaller pieces, and ground or rasped to small chips, or to a coarse powder. The aqueous extract is muddy and of a reddish-brown color. By acids the red color is made paler; by alkalies it is converted to purple. By mordanting the fabric with iron, black is produced; with alumina, violet and lilac; with copper, blue; and with chromium, a black or green. The coloring power of logwood depends chiefly on a crystalline ingredient called hæmatoxylin. It is employed in calico printing to give a black or brown color, and also in the preparation of some lakes. An extract of logwood is used in medicine as an astringent.

Logwood (*Hæmatonulon Campechianum*).

Loheia (lo-hā′yȧ), a seaport town of Arabia, Yemen, on the Red Sea, 130 miles W. N. W. of Sana. It has a trade in coffee, and a pop. of about 8000.

Lohengrin (lō′en-grin), the hero of a German poem of the end of the thirteenth century, represented as the son of Parcival and one of the guardians of the Holy Grail. Sent by King Arthur to help the Princess Elsa of Brabant, he arrives in a vehicle drawn by a swan, delivers the princess from captivity, and marries her; accompanies the emperor in a campaign against the Hungarians, and fights against the Saracens. He then returns to his bride at Cologne, but being pressed by her to state his origin he is prevailed upon to tell it, after which he must, in terms of his vow, return home to the Grail. The legend has been made the subject of a well-known opera by Wagner.

Loir (lwär), a river of N. W. France, rising in dep. Eure-et-Loir, traversing Loir-et-Cher and Sarthe, and falling into the Sarthe a few miles above its junction with the Loire; length, 180 miles, partly navigable.

Loire (lwär; anc. *Liger*), the largest river of France, which it divides into two nearly equal portions. It rises on the western slope of the Cevennes, in the department of Ardèche, and flows generally N. N. W. and W. till it falls into the Bay of Biscay below Nantes. Its principal affluents on the right are the Arroux, Nièvre, Maine, etc.; on the left the Allier, Vienne, Cher, Indre, etc. Below Nantes, where it first feels the influence of the tide, it is more an estuary than a river, and is studded with islets. Above Nantes navigation is much impeded by shallows. Its whole course is about 645 miles, of which about 450 miles are navigable. The river is much subject to disastrous inundations, and dikes (levées) have been constructed along its course. It is connected by canals with the Saône, Seine and Vilaine. Its name

appears in those of a number of departments.

Loire, a central department of France; area, 1853 square miles. The department occupies the upper part of the Loire basin, and consists of the fertile plains which extend on both sides of the river, forming its valley, and long ridges of the Cevennes, which hem the valley in on every side. More than one-half the surface is arable. A good deal of wine is produced, but ranks only as a *vin ordinaire* of good quality. Coals are raised to a large extent, part of the department being in the coal-field of the Loire, the most important in France. Iron is smelted, and extensively manufactured into steel and articles of hardware, etc., employing 25,000 hands; silk, ribbons, velvet, etc., are also made, the silk manufacture alone employing about 12,000 workers. The capital and great center of industry is St. Etienne; other towns are Roanne and Montbrison. Pop. (1906) 643,943.

Loire, HAUTE- (ōt-lwär; Upper Loire), a department of Southeastern France; area, 1931 square miles. It is traversed by the Loire, is surrounded on all sides by lofty mountains, which belong to the Cevennes, and has the character of a plateau intersected by deep river valleys. The mountains are generally covered with forests, in which wild boars, wolves, foxes, deer, etc., abound, or with verdant pastures, on which herds of cattle are reared. Some wine is produced; but the chief industry is the manufacture of various sorts of lace, largely a home industry. Le Puy is the capital. Pop. (1906) 314,770.

Loire-Inférieure (lwär-aṇ-fā-ri-eur; Lower Loire), a western maritime department of France, intersected by the lower Loire and its estuary; area, 2694 square miles. The surface is flat. The coast is much indented, and is covered with salt marshes which yield a considerable quantity of salt. Lagoons and lakes are very numerous. The largest is Grandlieu, which has an area of 24 square miles. The soil is generally productive, yielding grain, sugar-beet and grapes, from which large quantities of wine are produced. The oak forests pasture great numbers of swine, and bee-keeping is a considerable industry. The fisheries are extensive. Shipbuilding and the allied trades are carried on to a considerable extent. Smelting furnaces, machine-works, sugar refineries, are also in operation. To these may be added tanneries, glassworks, potteries, paper-mills, etc. Wine, salt, corn, cattle, etc., are exported. The principal ports are Nantes and St. Nazaire. Nantes is the capital. Pop. (1906) 666,748.

Loiret (lwå-rā), a central department of France; area, 2629 square miles. The surface is partly flat, partly undulating, with scarcely any hills, and is traversed by the Loire, which divides it into two unequal portions, the northern of which is the larger, and is fertile and well cultivated, while the southern is bleak and sterile. The Loiret is an unimportant tributary of the Loire. The chief products are grain and wine. Pottery and porcelain are the chief manufactures. Orléans is the chief town. Pop. 364,999.

Loir-et-Cher (lwär-ė-shār), a central department of France; area, 2479 square miles. It consists almost entirely of extensive plains, traversed by the Loire, Loir and Cher, all navigable rivers. The soil is generally fertile. More than one-half of the whole is arable, and less than one-eighth waste. Cereals of all kinds, hemp, beetroot for sugar, wine, fruits, are produced, and horses, cattle, and sheep are reared on excellent pastures. The capital is Blois. Pop. (1906) 276,019.

Loja (lō′*h*å), a city of Ecuador, in the valley of Casibamba, 230 miles S. of Quito, is well built, has a college, some manufactures, and a trade in cinchona bark. Pop. 10,000.

Loja, or LOXA (lō′*h*å), a town in Spain, Andalusia, in the valley of the Genil, 25 miles W. S. W. of Granada. The streets are steep and very irregular, and the houses mostly of mean appearance. The town with its castle was an important military post during the Moorish wars. Pop. 19,143.

Lok, or LOKI, in Scandinavian mythology, the evil deity, father of Hel or Hela, goddess of the infernal regions. He is a personification of the principle of evil, described as of handsome appearance, but perpetually engaged in works of wickedness partly directed against the other gods.

Lokeren (lō′ke-ren), a town of Belgium, in the province of East Flanders, on the Durme, has manufactures of cottons, lace, soap, tobacco, etc. Pop. (1904) 21,869.

Lokman (lok-man′), a name that figures in the traditions of the Arabians as that of a sage or prophet. In the Koran there is an account of a Lokman the Wise who lived at a time anterior to that of King David. He is represented as the author of a collection of fables, which, however, are of a later date than the first century of the Hejra.

Loli′go. See *Calamary.*

Lolium (lō'li-um), a genus of grasses of the tribe Hordeæ. See *Darnel* and *Rye-grass.*

Lolland. See *Laaland.*

Lollards (lol'ärdz), a name which arose in the Netherlands about the beginning of the fourteenth century, and was applied as a term of contempt to various sects or fraternities deemed heretical, being probably derived from the Low German *lollen*, to sing in a low tone. The name became well known in England about the end of the fourteenth century, when it was applied to the followers of Wickliffe, and to others more or less influenced by his teaching. The Wat Tyler revolt of 1381 was directly connected with Lollardism, and latterly the Lollards drew upon themselves the enmity of the civil powers, and numbers of them were put to death, especially during the reign of Henry V, when apparently another revolt was intended.

Lomami (lō-mä'mē), a river of Southern Africa, an important navigable tributary of the Congo, which it enters a little below Stanley Falls, after flowing nearly parallel to its upper course.

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